EFFECTIVENESS OF DELIRIUM PREVENTION BUNDLE AMONG CRITICALLY ILL PATIENTS ADMITTED IN INTENSIVE CARE UNIT AT KMCH, COIMBATORE.

Reg. No. 301610455

A DISSERTATION SUBMITTED TO THE TAMILNADU DR. M.G.R. MEDICAL UNIVERSITY, CHENNAI, IN PARTIAL FULFILLMENT OF REQUIREMENT FOR THE DEGREE OF MASTER OF SCIENCE IN NURSING

OCTOBER-2018

CERTIFICATE

This is to certify that the dissertation entitled **"A STUDY TO ASSESS THE EFFECTIVENESS OF DELIRIUM PREVENTION BUNDLE AMONG CRITICALLY ILL PATIENTS ADMITTED IN INTENSIVE CARE UNIT AT KMCH, COIMBATORE."** is submitted to the faculty of nursing, **THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY, CHENNAI** by **Register no. 301610455** in partial fulfilment of requirement for the degree of Master of Science in Nursing. It is the bonafide work done by him and the conclusions are his own. It is further certified that this dissertation or any part thereof has not formed the basis for award of any degree, diploma or similar titles.

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ABBREVATIONS

SL. NO	ACRONYMS	ABBREVATIONS
1	ICDSC	Intensive Care Delirium Screening Check List
2	RASS	Richmond Agitation Sedation Scale
3	CPOT	Critical care Pain Observation Tool
4	GCS	Glasgow Coma Scale

CHAPTER I
INTRODUCTION

"DISEASE IS SOMATIC; THE SUFFERING FROM IT IS PSYCHIC".

-PLATO

Introduction:

Critical illness is defined as any severe and life-threatening illnesses and injuries. Anintensive care unit (ICU) is a special department of a hospital or health care facility that provides intensive care for a critically ill patient, ICU care require constant, close monitoring and support from specialist equipment and medications in order to ensure normal bodily functions. (International Journal of Critical illness and injury science, 2015)

Mechanical ventilation is the medical term for artificial ventilation where mechanical means is used to assist or replace spontaneous breathing. This may involve a machine called a ventilator or the breathing may be assisted by mechanical device. Mechanical ventilation is termed "invasive" if it involves any instrument penetrating the trachea through the mouth, such as an endotracheal tube or the skin , such as a tracheostomy tube. There are two main types: positive pressure ventilation, where air (or another gas mix) is pushed into the trachea, and negative pressure ventilation, where air is, in essence, sucked into the lungs. There are many modes of mechanical ventilation, and their nomenclature has been revised over the decades as the technology has continually developed. (Tobin, 2014)

Disease is an unavoidable reality and is a community need. Disease occurs at different dimensions, such as social, behavioral, psychological, morphological

and molecular. The impact of disease has several problems like physical health problems, financial problems. The identified problems are feeling of neglect and loss of importance in the family and environmental problems. These problems further strengthen the feelings of loneliness, feelings of unwantedness, feeling of inadequacy, absolescence of skill and education. (Merriam, 2017)

A neurological disorder is any disorder of the nervous system. Structural, biochemical or electrical abnormalities in the brain, spinal cord or other nerves can result in a range of symptoms. Examples of symptoms include paralysis, muscle weakness, poor coordination, loss of sensation, seizures, confusion, pain and altered levels of consciousness. There are many recognized neurological disorders, some relatively common, but many rare. They may be assessed by neurological examination, and studied and treated within the specialities of neurology and clinical neuropsychology.(Greenamyre, 2016)

A mental disorder, also called a mental illness or psychiatric disorder, is a behavioral or mental pattern that causes significant distress or impairment of personal functioning. Such features may be persistent, relapsing and remitting, or occur as a single episode. Many disorders have been described, with signs and symptoms that vary widely between specific disorders. Such disorders may be diagnosed by a mental health professional. (Kouniaris, 2014)

Delirium is probably the single most common acute disorder affecting adults in general hospitals. It affects 10-20% of all hospitalized adults, and 30-40% of elderly who are hospitalized and up to 80% of those in ICU. Among those requiring critical care, delirium is a risk for death within the next year. Antipsychotics are not supported for the treatment or prevention of delirium among those who are in hospital. When delirium is caused by alcohol or sedative hypnotic withdrawal, benzodiazepines are typically used. (Ryan, 2018)

The study done by Jindal (2014**)** from India assessed the incidence, prevalence, risk factors and outcome of delirium in ICU patients. The prevalence rate for delirium was 53.6% and the incidence rate of delirium was 24.4%.

elirium is an acute neuropsychiatric syndrome, the possible measures for neuropsychiatric syndrome include preventative measures, lifestyle changes, physiotherapy or other therapy, neuro-rehabilitation, pain management, medication, or operations performed by neurosurgeons. The World Health Organization estimated in 2006 that neurological disorders and their squeal(direct consequences) affect as many as one billion people worldwide, and identified health inequalities and social stigma/discrimination as major factors contributing to the associated disability and suffering. (Wallack, 2014)

Delirium, also known as acute confusional state, is an organically caused decline from a previously baseline level of mental function. It often varies in severity over a short period of time, and includes attentional deficits, and disorganization of behavior. It typically involves other cognitive deficits, changes in arousal (hyperactive, hypoactive, or mixed), perceptual deficits, altered sleep-wake cycle, and psychotic features such as hallucinations and delusions. Delirium itself is not a disease, but rather a set of symptoms. It may result from an underlying disease, over-consumption of alcohol, from drugs administered during treatment of a disease, withdrawal from drugs or from any number of health factors. (Leonard, 2014)

Delirium may be caused by a disease process outside the brain that nonetheless affects the brain, such as infection (urinary tract infection, pneumonia) or drug effects, particularly anticholinergics or other CNS depressants (benzodiazepines and opioids).Although hallucinations and delusions are sometimes present in delirium, these are not required for the diagnosis, and the symptoms of delirium are clinically distinct from those induced by psychosis or hallucinogens (with the exception of deliriants.) Delirium must by definition be caused by an organic process, i.e., a physically identifiable structural, functional, or chemical problem in the brain (see organic brain syndrome), and thus, fluctuations of mentation due to changes in purely psychiatric processes or diseases, such as sudden psychosis from schizophrenia or bipolar disorder, are (by definition) not termed delirium. Like its components (inability to focus attention, mental confusion and various impairments in awareness and temporal and spatial orientation), delirium is the common manifestation of new organic brain dysfunction (for any reason). Delirium requires both a sudden change in mentation, and an organic cause for this. One of the main problems in patients with mechanical ventilation is the patient fails in mentation and they are not able to focus attention and get confused, which may also lead to delirium. So it is very important that patient on mechanical ventilator should be given more care psychological support to prevent them from functional brain damage. (Sessler, 2017)

In common usage, delirium is often used to refer to drowsiness, disorientation, and hallucination. Delirium is the commonest organic mental disorder seen in clinical practice. 5% to 15% of all patients in medical and surgical inpatient units are estimated to develop delirium at some time in their lives. This

percentage is higher in postoperative patients. Delirium is the most appropriate substitute for a variety of names used in the past such as acute confusional state, acute brain syndrome, acute organic reaction, toxic psychosis, and metabolic encephalopathy. (Jonghi, 2014)

Disruption of sleep-wake cycle is almost invariably present in delirium and often predates the appearance of a full-blown episode. Minor disturbances with insomnia or excessive daytime somnolence may be hard to distinguish from other medically ill patients without delirium, but delirium typically involves more substantial alterations with sleep fragmentation or even complete sleep-wake cycle reversal that reflect disturbed circadian rhythm regulation. The relationship of circadian disturbances to the characteristic fluctuating severity of delirium symptoms over a 24-hour period or to motor disturbance is unknown. In this case the patient with mechanical ventilator are mostly on sedation which alters the sleep-wake cycle, this may be harder to differentiate the patients whether they are stepping into delirium or not. (Hasemen, 2014)

Delirium most commonly affects the old age and those of ill health. Health results from physical and socioeconomic assets and opposing factors come from physical and socioeconomic deficits. Individuals with significant predisposing factors don't compensate for physical or social stressors ("precipitating factors"). In such an individual, a single or mild precipitating factor could be sufficient to trigger an episode of delirium. Conversely, delirium may only result in a healthy individual if they suffer serious or multiple precipitating factors. It is important to note that the factors affecting those of an individual can change over time, thus an individual's risk of delirium is in a state of flux. (Jabbar, 2016)

Any acute factors that affect neurotransmitter, neuroendocrine or neuroinflammatory pathways can precipitate an episode of delirium in a vulnerable brain. Clinical environments can also precipitate delirium, and optimal nursing and medical care is a key component of delirium prevention. (Milisen, 2015)

Delirium is a disorder of patient consciousness that is characterized by four aspects: an acute change in patient mental status, loss of attention, disturbance in thinking, and cognitive dysfunction. Delirium results from various causes in intensive care unit patients.(Joosten, 2014)

Delirium is a preventable medical condition that is a symptom of acute brain dysfunction. It occurs in 60% to 80% of critically ill patients who are receiving mechanical ventilation and in 20% to 50% of critically ill patients who are not receiving mechanical ventilation. These percentages mean that more than 40,000 patients receiving mechanical ventilation in intensive care units experience delirium every day. Patients receiving mechanical ventilation present a different set of risk factors for development of delirium; those factor include multi-system illness, co morbid conditions and medications. Delirium has both short term and long term side effects on patients' levels of function and cognition. **(**Mandy Bounds, American Association of Critical Nurses, 2017**)**

Episodes of delirium can be prevented by identifying hospitalized people at risk of the condition: those over 65, those with a known cognitive impairment, those with hip fracture, those with severe illness. Close observation for the early signs is recommended in those people. Systematically addressing the common contributing factors (such as constipation, dehydration and polypharmacy), as well as providing

a therapeutic environment (such as adequate lighting, minimizing noise, clear communication, minimizing relocation, signage, ways to tell the time, and helping the person to walk and be mobile) may prevent delirium. Rates with a number of interventions together decrease rates to 0.72 from baseline in the elderly. (Kowalska, 2014)

It is thought that 30–40% of all cases of delirium could be prevented, and that high rates of delirium reflect negatively on the quality of care. Melatonin and other pharmacological agents have been studied for prevention of postoperative delirium, but evidence is not clear. In critically ill individuals avoidance or cautious use of benzodiazepines has been recommended to reduce the risk of delirium. (Kilimiec, 2015)

Need for the study:

"TREATMENT WITHOUT PREVENTION IS SIMPLY UNSUSTAINABLE"

- BILL GATES

Human body is the most beautiful and generous creation of God. It has the ability to adapt to the various situations provided, but vigorous changes in climatic conditions, factors especially the ones resulting from vigorous industrialization, food pattern, and personal habits can harm it drastically and force it to death. (Daniel L. Herr, 2014)

Delirium may be distinguished from psychosis, in which consciousness and cognition may not be impaired (however, there may be overlap, as some acute psychosis, especially with mania, is capable of producing delirium-like states). Delirium is distinguished from dementia (chronic organic brain syndrome) which

describes an "acquired" (non-congenital) and usually irreversible cognitive and psychosocial decline in function. Dementia usually results from an identifiable degenerative brain disease (for example Alzheimer disease or Huntington's disease). Dementia is usually not associated with a change in level of consciousness, and a diagnosis of dementia requires a chronic impairment. Delirium is distinguished from depression. Delirium is distinguished by time-course from the confusion and lack of attention which result from long term learning disorders and varieties of congenital brain dysfunction. Delirium has also been referred to as 'acute confusional state' or 'acute brain syndrome'. The key word in both of these descriptions is "acute" (meaning: of *recent onset*), since delirium may share many of the clinical (i.e., symptomatic) features of dementia or developmental disabilities including attention deficit hyperactivity disorder, with the important *exception* of symptom duration. (John P. Kress, 2015)

Delirium represents an organically caused decline from a previously attained level of cognitive functioning. It is a corollary of these differential criteria that a diagnosis of delirium *cannot* be made without a previous assessment, or knowledge, of the affected person's *baseline* level of cognitive function. In other words, a mentally disabled or demented person who is operating at their own baseline level of mental ability might appear to be delirious without a baseline functional status against which to compare.(Richmond VA, 2014)

Delirium remains unrecognized in 66% to 84% of patients in ICUs, acute care and emergency departments and is under documented and undertreated. Delirium prevention outweighs available delirium treatment options. Key strategies

for preventing delirium and decreasing its duration include early identification and avoiding or modifying patient-related, environmental, and iatrogenic factors. If hospital staffs are able to consistently implement preventive measures on an ongoing basis, delirium incidence may decrease, resulting in improve outcomes for patient and hospitals.(Marelo.G.Rocha, 2017)

There is substantial evidence that delirium results in long-term poor outcomes in older persons admitted to hospital. This systematic review only included studies that looked for an independent effect of delirium (i.e., after accounting for other associations with poor outcomes, for example co-morbidity or illness severity).In older persons admitted to hospital, individuals experiencing delirium are twice as likely to die than those who do not. In the only prospective study conducted in the general population, older persons reporting delirium also showed higher mortality (60% increase). So it is much better to prevent delirium in ICUs rather than treating it.(Devlin, 2014)

Delirium, an acute and fluctuating disturbance of consciousness and cognition, is a common manifestation of acute brain dysfunction in critically ill patients, occurring in up to 80% of the sickest intensive care unit (ICU) populations. Critically ill patients are subject to numerous risk factors for delirium. Some of these, such as exposure to sedative and analgesic medications, may be modified to reduce risk. (Jorge, Salluh, et, al., Delirium Epidemiology in Critical care, 2016)
Clinical experience and recent research have shown that delirium can become chronic or result in permanent sequelae. In elderly individuals, delirium can initiate or otherwise be a key component in a cascade of events that lead to a downward

spiral of functional decline, loss of independence, institutionalization, and, ultimately, death. Delirium affects an estimated 14–56% of all hospitalized elderly patients. At least 20% of the 12.5 million patients over 65 years of age hospitalized each year in the US experience complications during hospitalization because of delirium. (Girard, 2015)

The overall prevalence of delirium in the community is just 1–2%, but in the setting of general hospital admission this increases to 14–24%. The incidence of delirium arising during a hospital stay ranges from 6% to as high as 56%,[6] and this incidence is even higher when more-specialized populations are considered, including those in postoperative, intensive-care, subacute and palliative-care settings. Postoperative delirium occurs in 15–53% of surgical patients over the age of 65 years, and among elderly patients admitted to an intensive care unit (ICU) the delirium incidence can reach 70–87%. International studies have demonstrated incidence from 25% to 87% in critically ill patients. Delirium is potentially modifiable depending on the individual patients' circumstances. (Jhonson, 2018)
Among India the incidence and prevalence rate of delirium were 24.4% and 53.6% respectively. Univariate analyses revealed that the prevalence of delirium was higher (64%) in mechanically ventilated patients. The predisposing risk factors identified for delirium in univariate analysis were higher age; higher Glasgow Coma Scale score; increased APACHE II score; hyperuricemia; hypoalbuminemia; presence of acidosis; abnormal alkaline transferase levels; use of mechanical ventilation; higher number of total medication received and use of sedative, steroids and insulin**.(**Sharma.A, Malhotra.S, et al.,2014**)**

We know from the evidence that delirium is bad for patients; it leads to longer hospital stays and increases their risk of injury. We know from our experience that delirium is also bad for caregivers; providing for patients with delirium is stressful and can affect health cate team dynamics. The best treatment for delirium is prevention, which can be achieved through the multiprolonged approach, often called a "bundle", to address the diverse causes of delirium simultaneously; because of the multiple associated risks and adverse outcomes that may result from delirium, strategies to reduce the prevalence and duration of delirium should be implemented in ICUs.**(**Grami, AJCC, 2016**).**

Multiple guidelines recommend that delirium should be diagnosed when it presents to healthcare services. Much evidence suggest, however, that delirium is greatly under diagnosed. Higher rates of detection of delirium in general settings can be assisted by the use of validated delirium screening tools. Many such tools have been published. They differ in duration, complexity, need for training, and so on. Examples of tools in use in clinical practice are: Delirium Observation Screening Scale, the Nursing Delirium Screening Scale (Nu-DESC), the Confusion Assessment Method, the Recognizing Acute Delirium As part of your Routine (RADAR) tool and the 4 "A"s Test or 4AT. (Riker, 2015)

Whereas in the ICU, international guidelines recommend that every patient gets checked for delirium every day (usually twice or more a day) using a validated clinical tool. The two most widely used are the Confusion Assessment Method for the ICU (CAM-ICU) and the Intensive Care Delirium Screening Checklist (ICDSC). There are translations of these tools in over 20 languages and they are

used globally in many thousands of ICUs, and instructional videos. It is not as important which tool is used as that the patient gets monitored. Without using one of these tools, 75% of ICU delirium is missed by the practicing team, which leaves the patient without any likely active interventions to help reduce the duration of his/her delirium. (Robinson, 2015)

The most salient component of the definition of delirium that nurses and other healthcare professionals use at the bedside is whether or not the patient can pay attention and follow simple commands. The advent of daily monitoring for delirium, made easy by the CAM-ICU and other assessment tools, as well as proper documentation, had led to important changes in the culture of ICUs and rounds in that the entire team can now discuss the brain and how it is doing in terms of being "on" (not delirious) or "off" (delirious) and then focus on the several most likely causes of delirium in any specific patient. Thus, it is not the monitoring itself that changes the patient's clinical course, but rather it is this combination of monitoring and then relaying the information on rounds in the ICU that makes such a huge difference in awareness of this form of organ dysfunction and then enables a difference to be made in clinical outcomes.(Joffe, 2017)

The highest rates of delirium (often 50% to 75% of people) are seen among those who are critically ill in the intensive care unit (ICU). As a result, this was referred to as "ICU psychosis" or "ICU syndrome", terms largely abandoned for the more widely accepted term ICU delirium. Since the advent of validated and easy-to-implement delirium instruments for ICU patients such as the Confusion Assessment Method for the ICU (CAM-ICU) and the Intensive Care Delirium Screening Checklist (IC-DSC)., of the hundreds of thousands of ICU patients who

develop delirium in ICUs every year, it has been recognized that most of them belong to the hypoactive variety, which is easily missed and invisible to the managing teams unless actively monitored using such instruments. The causes of delirium in such patients depend on the underlying illnesses, new problems like sepsis and low oxygen levels, and the sedative and pain medicines that are nearly universally given to all ICU patients. Outside the ICU, on hospital wards and in nursing homes, the problem of delirium is also a very important medical problem, especially for older patients. (DiSabatino Smith, 2017)

The most recent area of the hospital in which delirium is just beginning to be monitored routinely in many centers is the Emergency Department, where the prevalence of delirium among older adults is about 10%. A systematic review of delirium in general medical inpatients showed that estimates of delirium prevalence on admission ranged from 10 to 31%. About 5% to 10% of older adults who are admitted to hospital develop a new episode of delirium while in hospital. Rates of delirium vary widely across general hospital wards. Estimates of the prevalence of delirium in nursing homes are between 10% to45%. Delirium is not always transient and reversible, and it can result in long-term cognitive changes. So the best way is to get prevented. (Brice, 2016)

Several issues relating to outcomes also need to be clarified. For example, there is evidence for long-term effects on cognition following delirium, but how often this leads to permanent cognitive impairment, including mild cognitive impairment or dementia, is still not known. Also, it is not yet clear whether delirium leads to permanent neurological injury that can be measured with laboratory, electrophysiological or neuro-imaging markers. (Brummal NE et al, 2014)

Delirium is a serious cause and complication of hospitalization in elderly patients and should be considered to be a medical emergency until proven otherwise. Irrespective of the specific etiology, this condition has the potential to markedly affect the overall outcome and prognosis of severely ill patients, as well as substantially increasing health-care utilization and costs. For these reasons, prevention, early recognition and effective treatment of delirium are essential. (Jaeschke, 2016)

Statement of the Problem:

A study to assess the effectiveness of delirium prevention bundle among critically ill patients admitted in intensive care unit at KMCH, Coimbatore.

Objectives:

The objectives of the study were to:

- assess delirium incidence among critically ill patients admitted in intensive care unit.
- evaluate the effectiveness of delirium prevention bundle in decreasing delirium incidence among critically ill patients admitted in intensive care unit.
- associate the incidence of delirium among critically ill patients with their selected socio demographic and clinical variables admitted in intensive care unit .

HYPOTHESES

H_1: There is a significant difference between the mean pre-test and post test level of delirium prevention in experimental group among critically ill patients admitted in intensive care unit.

H_2: There is a significant difference between post test level of delirium prevention in experimental and control group among critically ill patients admitted in intensive care unit.

H_3: There is a significant association between level of delirium prevention among critically ill patients with their selected sociodemographic and clinicalvariables admitted in intensive care unit.

Operational Definition:

Delirium prevention bundle

The bundle incorporates multidisciplinary measures with a set of interventions. like Sedation Awakening Trial (SAT), Spontaneous Breathing trial (SBT), Coordination, Choice of analgesia and sedation, Delirium prevention and management, and Early physical mobility.

Delirium

The patients who have the ICDSC score more than 4 are considered as delirium.

Pain

The patients who have the CPOT score of 2 and above are considered as Pain.

Agitation

The patients who have the RASS score range from +1 to +4 are considered as agitation.

Assumption

- The patients those who are admitted in intensive care unit who receive mechanical ventilation are having high risk for developing delirium.
- Pain and analgesia may have a lot of influence on delirium

Conceptual Frame Work

A conceptual frame work is a theoretical approach to the study of problems that are scientifically based and emphasis the selection, arrangement and classification of its concept. Concepts are words that depict objects, properties or events and are basic components of theory.

Conceptual frame work deals with abstraction or concepts that are assembled by virtue of their relevance to a common theme. Conceptualization is a process of forming ideas which is utilized and forms conceptual frame work for development of research design. It helps the researchers by giving direction to go about the entire research process.

The Neuman Systems Model views the client as an open system that responds to stressors in the environment. The client variables are physiological, psychological, socio-cultural, developmental, and spiritual. The client system consists of a basic or core structure that is protected by lines of resistance. The usual level of health is identified as the normal line of defence that is protected by a flexible line of defence. Stressors are intra-, inter-, and extra-personal in nature and arise from the internal, external, and created environments. When stressors break through the flexible line of defence, the system invades and the lines of resistance are activated and the system is described as moving into illness on a wellness-illness continuum. If adequate energy is available, the system will be reconstituted with the normal line of defence restored at, below, or above its previous level.

Nursing interventions occur through three prevention modalities. Primary prevention occurs before the stressor invades the system; secondary prevention occurs after the system has reacted to an invading stressor; and tertiary prevention occurs after the system has reacted to an invading stressor; and tertiary prevention occurs after secondary prevention as reconstitution is being established.

In this study this conceptual framework explains about the prevention of delirium.

Primary Prevention:

Primary prevention occurs before the system reacts to a stressor; it includes health promotion and maintenance of wellness. Primary prevention focuses on strengthening the flexible line of defence through preventing stress and reducing risk factors. In this study the primary prevention is not assessed.

Flexible Line of Defence:

A protective accordion-like mechanism that surrounds and protects the normal line of defence from invasion by stressors. In this study the effect on flexible line of defence are changes in state of arousal, alteration in sleep awake cycle, fever.

Secondary Prevention:

Secondary prevention occurs after the system reacts to a stressor and is provided in terms of existing symptoms. Secondary prevention focuses on strengthening the internal lines of resistance and, thus, protects the basic structure through appropriate treatment of symptoms. If secondary prevention is unsuccessful

and reconstitution does not occur, the basic structure will be unable to support the system and its interventions, and death will occur. In this study secondary prevention done by State Awaking Trail, Spontaneous Breath Trail, Choice of Analgesia, Early mobilization

Normal Line of Defence:

An adaptation level of health developed over time and considered normal for a particular individual client or system; it becomes a standard for wellness-deviance determination. In this study the effect on normal line of defence delusions, hallucinations, hyper/hypo active behaviour and may have perceptual deficit.

Tertiary prevention:

Tertiary preventionoccurs after the system has been treated through secondary prevention strategies. Its purpose is to maintain wellness or protect the client system reconstitution through supporting existing strengths and continuing to preserve energy. Tertiary prevention may begin at any point after system stability has begun to be re-established (reconstitution has begun). Tertiary prevention tends to lead back to primary prevention. In this study the tertiary prevention are re-assessment of delirium, regular follow up and maintenance of patient's support system.

Line of Resistance:

Protection factors activated when stressors have penetrated the normal line of defence, causing a reaction symptomatology. Here the effects on line of resistance are weakening of immune response, Co-morbidity and may have some psychotic features.

Stressor:

A stressor is any phenomenon that might penetrate both the flexible and normal lines of defence, resulting in either a positive or negative outcome. In this study the stressor is critical illness which penetrates both flexible and normal line of defence.

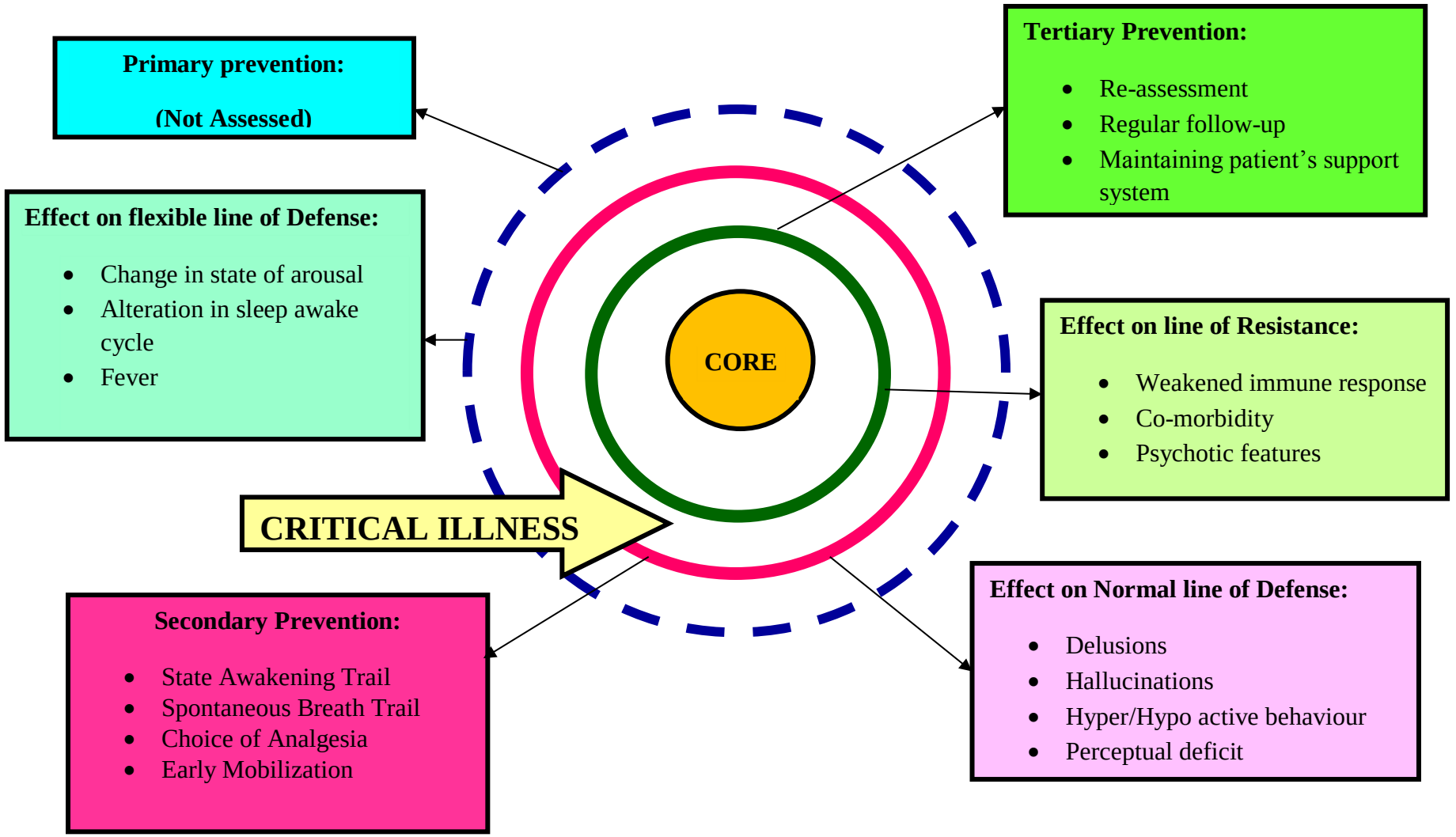

Fig: 1. Modified Bettyneuman's System Model

CHAPTER II
REVIEW OF LITERATURE

According to **Polit and Hungler (2003)** literature review is a written summary of the state of existing knowledge on a research problem. The task of reviewing research literature involves the identification, selection of a critical analysis and written description of existing information on a topic.

The review of literature was organized under the following headings:

- Literature related to short term and long term impact of delirium on patient's physical and psychological outcome
- Literature related to factors related to delirium
- Literature related to strategies to prevent delirium
- Literature related to evidence based guidelines and bundles approach to delirium prevention.

Literature related to short term and long term impact of delirium on patient's physical and psychological outcome:

Sungmin Kin et al, (2016), conducted a retrospective study in the Institute of Behavioural Science in Medicine, South Korea, using CAM method the delirium is screened for patients in general ward, surgical ward and ICUs. The sample size is 160 (26 ICU, 134 ward). 53 patients were excluded, 123 samples were enrolled 48-medical, 49- post operative, 26- post operative delayed. The study states that among three groups post operative delayed patients showed significantly (P<=0.001) longer delirium duration when compared to other 2 groups, because of the usage of benzodiazipines.

Jorge I F Salluh, (2017) conducted a study delirium was identified in 5280 of 16 595 (31.8%) critically ill patients reported in 42 studies. When compared with control patients without delirium, patients with delirium had significantly higher mortality during admission (risk ratio 2.19, 94% confidence interval 1.78 to 2.70; P<0.001) as well as longer durations of mechanical ventilation and lengths of stay in the intensive care unit and in hospital (standard mean differences 1.79 (95% confidence interval 0.31 to 3.27; P<0.001), 1.38 (0.99 to 1.77; P<0.001), and 0.97 (0.61 to 1.33; P<0.001), respectively). Available studies indicated an association between delirium and cognitive impairment after discharge.eep promotion, sedation cessation.

Rodrigo B. Serafim, (2016) conducted a study which describes subsyndromal delirium (SSD) is a frequent condition and has been commonly described as an intermediate stage between delirium and normal cognition. However, the true frequency of SSD and its impact on clinically relevant outcomes in the intensive care unit (ICU) remains unclear. The six eligible studies were evaluated. SSD was present in 950 (36%) patients. Four studies evaluated only surgical patients. Four studies used the Intensive Care Delirium Screening Checklist (ICDSC) and two used the Confusion Assessment Method (CAM) score to diagnose SSD. The meta-analysis showed an increased hospital length of stay (LOS) in SSD patients (0.31, 0.12–0.51, $p = 0.002$; $I^2 = 34\%$). Hospital mortality was described in two studies but it was not significant (hazard ratio 0.97, 0.61–1.55, $p = 0.90$ and 5% vs 9%, $p = 0.05$). The use of antipsychotics in SSD patients to prevent delirium was evaluated in two studies but it did not modify ICU LOS (6.5 (4–8) vs 7 (4–9) days, $p = 0.66$ and 2 (2–3) vs 3 (2–3) days, $p = 0.517$) or mortality (9 (26.5%) vs 7

(20.6%), $p = 0.55$). SSD occurs in one-third of the ICU patients and has limited impact on the outcomes. The current literature concerning SSD is composed of small-sample studies with methodological differences, impairing a clear conclusion about the association between SSD and progression to delirium or worse ICU clinical outcomes.

Caraceni A, Nanni O et.al.,(2018) conducted the study and the objective of study was to evaluate the impact of delirium on the survival of advanced cancer patients also assessed with a validated prognostic score (the palliative prognostic [PaP] score). The study population was a prospective multicenter consecutive case series of advanced cancer patients for whom chemotherapy was no longer considered viable and who were referred to palliative care programs. Clinical and biologic prognostic factors included in the PaP score were assessed at study entry. The Confusion Assessment Method criteria were applied to screen patients presenting with delirium. Survival times were measured from time of enrollment and death taken as an outcome. Survival curves were traced with the Kaplan-Meier method and comparison were based on log rank tests. Delirium was found in 109 cases among 393 consecutive patients (27.7%). The diagnosis of delirium was independently associated with male gender, central nervous system metastases, lower performance status, worse clinical prediction of survival, and progestational treatment. The survival curve of patients with delirium was significantly different from the nondelirious patients curve (log rank, 31.6, P <0.0001). The median survival time was 21 days (95% confidence interval [CI], 16-27) for the delirious patients and 39 days (95% CI 33-49) for the others. Multivariate analysis showed that the diagnosis of delirium and PaP score were independently associated with

prognosis. The diagnosis of delirium significantly worsens life expectancy prognosticated with the PaP score. By using the PaP score together with the assessment of cognitive status, physicians can correctly predict patients 30-day survival in greater than 70% of cases.

Van den Boogaard M, Schoonhoven L, et. al (2015) conducted a study which states that delirium is a serious and frequent psycho-organic disorder in critically ill patients. Reported incidence rates vary to a large extent and there is a paucity of data concerning delirium incidence rates for the different subgroups of intensive care unit (ICU) patients and their short-term health consequences. The objective was to determine the overall incidence and duration of delirium, per delirium subtype and per ICU admission diagnosis. Furthermore, we determined the short-term consequences of delirium.1613 patients were included of which 411 (26%) developed delirium. The incidence rate in the neurosurgical (10%) and cardiac surgery group (12%) was the lowest, incidence was intermediate in medical patients (40%), while patients with a neurological diagnosis had the highest incidence (64%). The mixed subtype occurred the most (53%), while the hyperactive subtype the least (10%). The median delirium duration was two days [IQR 1-7], but significantly longer ($P<0.0001$) for the mixed subtype. More delirious patients were mechanically ventilated and for a longer period of time, were more likely to remove their tube and catheters, stayed in the ICU and hospital for a longer time, and had a six times higher chance of dying compared to non-delirium ICU patients, even after adjusting for their severity of illness score. Delirium was associated with an extended duration of mechanical ventilation, length of stay in the ICU and in-hospital, as well as with in-hospital mortality. The delirium

incidence in a mixed ICU population is high and differs importantly between ICU admission diagnoses and the subtypes of delirium. Patients with delirium had a significantly higher incidence of short-term health problems, independent from their severity of illness and this was most pronounced in the mixed subtype of delirium. Delirium is significantly associated with worse short-term outcome.

Literature related to factors related to delirium

G.Jiayang et al., (2017), conducted a quantitative study on risk factors of delirium in sequential sedation patients in intensive care units at Chengudu, China. In this study 141 patients were enrolled, using CAM method delirium was screened and they concluded that the risk factors were older age (P=0.005) (R=2.432), higher SOFA Score (P=0.02) (R=2.022), regular smoking (P=0.006) (R=2.366), usage of higher maintenance dose of midazolam (P=0.049) (R=1.052), usage of higher mainteance dose of fentanyl (P=0.001) (R=1.045), usage of dexmeditomidine (P=0.040) (R=0.448).

Bart Van Rompaey and Leo Bossaertet al., (2014), Conducted a study in which total population of 523 patients was screened for delirium. The studied factors showed some variability according to the participating hospitals. The overall delirium incidence was 30%. Age was not a significant risk factor. Intensive smoking (OR 2.04), daily use of more than three units of alcohol (OR 3.23), and living alone at home (OR 1.94), however, contributed to the development of delirium. In the domain of chronic pathology a pre-existing cognitive impairment was an important risk factor (OR 2.41). In the domain of factors related to acute illness the use of drains, tubes and catheters, acute illness scores, the use of

psychoactive medication, a preceding period of sedation, coma or mechanical ventilation showed significant risk with odds ratios ranging from 1.04 to 13.66. Environmental risk factors were isolation (OR 2.89), the absence of visit (OR 3.73), the absence of visible daylight (OR 2.39), a transfer from another ward (OR 1.98), and the use of physical restraints (OR 33.84).This multicenter study indicated risk factors for delirium in the intensive care unit related to patient characteristics, chronic pathology, acute illness, and the environment. Particularly among those related to the acute illness and the environment, several factors are suitable for preventive action.

NejlaTilouche and S. Souheil El Atrouset al., (2018), conducted a study in that total of 206 patients were included, 167 did not present delirium and 39 (19%) were analyzed for delirium. Delirious patients had a significantly longer duration of mechanical ventilation (10 days[6–20] vs. 2 days[0–7]) respectively and length of stay in ICU (21.5 days [10.5–32.5] vs. 8 days [5–13]), with no impact on mortality. Delirium was associated with high incidence of unintentional removal of catheters (39% vs. 9%; $P< 0.0001$), endotracheal tubes (18% vs. 1%; $P< 0.0001$), and urinary catheters (28% vs. 2%, $P< 0.0001$). In multivariable risk regression analysis, age (odds ratio [OR] = 4.1, 95% confidence interval [CI]: 1.39–12.21; $P = 0.01$), hypertension (OR = 3.3, 95% CI: 1.31–8.13; $P = 0.011$), COPD (OR = 3.5, 95% CI: 1.47–8.59; $P = 0.005$), steroids (OR = 2.8, 95% CI: 1.05–7.28; $P = 0.038$), and sedation (OR = 5.4, 95% CI: 2.08–13.9; $P< 0.0001$) were independent risk factors for delirium. We did not find a relationship between delirium and mortality.Delirium is frequent in the ICU and is associated with poor outcome. Several risk factors for delirium are linked to intensive care environment.

Ihsan Mattar. (2015), conducted a multicenter prospective study among mechanically ventilated patients in Uganda. Eligible patients were screened daily for delirium using the confusional assessment method (CAM-ICU). Comparisons were made using -test, chi-squares, and Fisher's exact test. Predictors were assessed using logistic regression. The level of statistical significance was set and the results were of 160 patients, 81 (51%) had delirium. Median time to onset of delirium was 3.7 days. At bivariate analysis, history of mental illness, sedation, multiorgan dysfunction, neurosurgery, tachypnea, low mean arterial pressure, oliguria, fevers, metabolic acidosis, respiratory acidosis, anaemia, physical restraints, marital status, and endotracheal tube use were significant predictors. At multivariable analysis, having a history of mental illness, sedation, respiratory acidosis, higher PEEP, endotracheal tubes, and anaemia predicted delirium. Conclusion. The prevalence of delirium in a young African population is lower than expected considering the high mortality. A history of mental illness, anaemia, sedation, endotracheal tube use, and respiratory acidosis were factors associated with delirium.

Felipe Martinez (2016), conducted a meta-analysis in which twenty-two studies were included. A large number of risk factors were presented in the literature; some of these were common across all settings whilst others were exclusive to the type of setting. Benzodiazepines and opioids were shown to be risk factors for delirium independent of setting. It was concluded with regard to patients admitted to medical and surgical intensive care units, risk factors of older age and co-morbidity were common. In the cardiac ICU, older age and lower Mini-Mental Status Examination scores were cited most often as risk factors for delirium, but other risk factors exclusive to the setting were also significant. Benzodiazepines were identified as the most significant pharmacological risk factor for delirium.

Literature related to strategies to prevent delirium

Micheal .C. Reade & Simon Finfer, (2018), conducted a true experimental study, in which 90 critically ill patients in intensive care unit at Burns, Trauma and critical care Research Centre, University of Queensland, Australia. Data collection tool used was COPT and behaviour pain scale for assessing pain and to assess sedation level they used Richmond Agitation Scale and also delirium is screened using CAM method . The result was pain is a contributing factor for causing delirium and dexmedetomidine is comparatively effective than benzodiazepine as a sedative in preventing delirium.

Catalina TobarandNathan Hill, (2015), conducted a study to assess the efficacy of multicomponent interventions in preventing incident delirium in the elderly. A systematic review of randomised trials was undertaken. Two independent reviewers performed iterative literature searches in seven databases without language restrictions. Grey literature repositories were considered as well. The quality of included trials was assessed by using the criteria established by the Cochrane Collaboration. When possible, data were synthesised into a meta-analysis. Heterogeneity was assessed using the χ^2 and I^2 tests. The findings were total of 21,788 citations were screened, and seven studies of diverse quality were included in the review, comprising 1,691 participants. Multicomponent interventions significantly reduced incident delirium (relative risk [RR] 0.73, 95% confidence interval [CI] 0.63–0.85, $P< 0.001$) and accidental falls during the hospitalisation (RR 0.39, 95% CI 0.21, 0.72, $P = 0.003$), without evidence of differential effectiveness according to ward type or dementia rates. Non-significant reductions in delirium duration, hospital stay and mortality were found as well and

the interpretation was multicomponent interventions are effective in preventing incident delirium among elderly inpatients. Effects seemed to be stable among different settings. Due to the limited amount of data, potential benefits in survival need to be confirmed in further studies. Future research should be aimed at contrasting different multicomponent programmes to select the most useful interventions.

Tia R.M. Kostas, (2014) conducted a study on delirium risk may be assessed using known patient-based and illness-based risk factors, including preexisting cognitive impairment. Delirium diagnosis remains a clinical diagnosis that requires a clinical assessment that can be structured using diagnostic criteria. Hospital systems may be useful to efficiently allocate delirium resources to prevent and manage delirium. Second, it is crucial to develop a systematic approach to prevent delirium using multimodal non-pharmacologic delirium prevention methods and to monitor all high-risk patients for its occurrence. Tools such as the modified Richmond Agitation and Sedation Scale can aid in monitoring for changes in mental status that could indicate the development of delirium. Third, hospital systems can utilize established methods to assess and manage delirium in a standardized fashion. The key lies in addressing the underlying cause/causes of delirium, which often involve medical conditions or medications. With a sustained commitment, standardized efforts to identify and prevent delirium can mitigate the long-term morbidity associated with this acute change. In the face of changes in health care funding, delirium serves as an example of a syndrome where care coordination can improve short-term and long-term costs.

Hao Zhang, (2017), have conducted a study on the ideal measures to prevent postoperative delirium remain unestablished. They conducted the systematic review and meta-analysis to clarify the significance of potential interventions.Randomized clinical trials (RCTs) on interventions seeking to prevent postoperative delirium in adult patients were included. Data extraction and methodological quality assessment were performed using predefined data fields and scoring system. Meta-analysis was accomplished for studies that used similar strategies. The primary outcome measure was the incidence of postoperative delirium. They further tested whether interventions effective in preventing postoperative delirium shortened the length of hospital stay and identified 38 RCTs with interventions ranging from perioperative managements to pharmacological, psychological or multicomponent interventions. Meta-analysis showed dexmedetomidine sedation was associated with less delirium compared to sedation produced by other drugs (two RCTs with 415 patients, pooled risk ratio (RR) = 0.39; 95% confidence interval (CI) = 0.16 to 0.95). Both typical (three RCTs with 965 patients, RR = 0.71; 95% CI = 0.54 to 0.93) and atypical antipsychotics (three RCTs with 627 patients, RR = 0.36; 95% CI = 0.26 to 0.50) decreased delirium occurrence when compared to placebos. Multicomponent interventions (two RCTs with 325 patients, RR = 0.71; 95% CI = 0.58 to 0.86) were effective in preventing delirium. No difference in the incidences of delirium was found between: neuraxial and general anesthesia (four RCTs with 511 patients, RR = 0.99; 95% CI = 0.65 to 1.50); epidural and intravenous analgesia (three RCTs with 167 patients, RR = 0.93; 95% CI = 0.61 to 1.43) or acetylcholinesterase inhibitors and placebo (four RCTs with 242 patients, RR = 0.95; 95% CI = 0.63 to 1.44). Effective prevention of

postoperative delirium did not shorten the length of hospital stay (10 RCTs with 1,636 patients, pooled SMD (standard mean difference) = -0.06; 95% CI = -0.16 to 0.04).The included studies showed great inconsistencies in definition, incidence, severity and duration of postoperative delirium. Meta-analysis supported dexmedetomidine sedation, multicomponent interventions and antipsychotics were useful in preventing postoperative delirium.

Carlos Ignacio Beddings, (2018), conducted a study to assess the efficacy of multicomponent intervention in delirium prevention. Total of 287 hospitalised patients at intermediate or high risk of developing delirium were randomised to receive a non-pharmacological intervention delivered by family members (144 patients) or standard management (143 patients). The primary efficacy outcome was the occurrence of delirium at any time during the course of hospitalisation. Three validated observers performed the event adjudication by using the confusion assessment method screening instrument. The results were no significant differences in the baseline characteristics between the two groups. The primary outcome occurred in 5.6% of the patients in the intervention group and in 13.3% of the patients in the control group (relative risk: 0.41; confidence interval: 0.19–0.92; $P = 0.027$). This study show that there is a benefit in the non-pharmacological prevention of delirium using family members, when compared with standard management of patients at risk of developing this condition.

Literature related to evidence based guidelines and bundles approach to delirium prevention.

Kathryn.T Von Rueden et al, (2017), conducted a experimental study in which 215 critically ill patients in ICUs, University of Maryland. 24% of patients were positive for delirium among them were 36% of ICU patients and 11% IMCU (P=0.004). The tools used in this study were Apache, CAM, RASS. These results if the delirium prevention protocols are used in the occurrence of delirium can be prevented in ICU and intermittent care units.

Felipe Martinez et al., (2014), conducted a retrospective study among 227 critically ill patients, Unidad decuidadosIntensivos General Hospital, Chile. CAM method was used to assess delirium and they are assessed twice daily. The components included in this study are early mobilisation, physical therapy, re-orientation, cognitive stimulation, drug review, environmental stimulation, avoidance of sensory deprivation, pain control, restrain use avoidance and family participation. Among 227 samples 54.7% were male, mean (SD) age, 63.3 (18.3) years, P=0.02. when these strategy is applied to the samples the risk of delirium is reduced from 38% to 24%.

Dustin.M.Hipp E (2012), Conducted a study in Vanderbelt University School of Medicine, USA as pharmacological and non-pharmacological management of delirium in critically ill patients. They used antipsychotics and α_2 agonist as pharmacological management for delirium in which they conducted a safety and efficiency of dexmedetomidine compared with midazolam (SEDCOM) trail among 375 mechanical ventilated patients in 68 centres (P=0.02) which has

proved that dexmedetomidine (α_2 agonist) is effective in preventing delirium among critically ill patients. As non-pharmacological management they conducted a study among 167 mechanical ventilated patients. The components used are spontaneous awakening trail (SAT), spontaneous breath trail (SBT), Early physical mobility, which has proved that SAT strategy decrease the duration of mechanical ventilation by 2 days (P=0.004). SBT strategy say that weaning from ventilator by 2 days (P=0.003). when the SAT & SBT are implemented together it reduces the ICU stay by 4 days (P=0.002),thus the combination trail is more effective in preventing delirium by reducing the hospital (ICU) stay.

Claudia Disabatino Smith and Petra Grami (2016), conducted a study at St. Luke's Medical Centre, Texas. They used delirium prevention bundle to prevent delirium, which is comprised of sedation cessation, pain management, sensory stimulation, early mobility, sleep promotion. The design used was cohort design among 447 samples. This study shows that after implementing the above mentioned bundle the risk of delirium is reduced by 78% (P=0.001).

Leona Bannol et al, (2016), conducted a study at centre for Infection & immunity school of Medicine, Northern Island. The study states that all critically ill patients have an increased risk of developing delirium during their intensive care stay and the pharmacological management have not been shown to be effective for delirium management but non-pharmacological interventions like spontaneous breath trail, spontaneous awakening trail, early mobilisation, noise reduction, light reduction have been shown effective for preventing delirium.

Sarah.A.Delgado, (2017), conducted a study on preventing delirium in critically ill patients at Vanderbelt University Medical centre, USA. This study states that the best management for delirium is prevention. It can be achieved using a multiprolonged approach often called bundle. She haveimplementented the bundle for 256 critically ill patients and the bundle was successful in preventing delirium. The bundle comprised of early mobilization, sensory stimulation, pain management

RESEARCH LITERATURE REVIEW RELATED TO DELIRIUM

S.NO.	AUTHORS	SETTING	SAMPLE	INTERVENTION	RESULT
1.	SungminKinet al	General ward, Surgical ward and ICUs	Patients with delirium	Usage of benzodiazipines	Showed significantly longer delirium duration with the use of benzodiazipines.
2.	Jorge I F Salluh	Intensive care unit	Critically ill patients	Comparision of delirium patients with patients without delirium	Patients with delirium had higher mortality and morbidity
3.	Rodrigo B. Serafim	Intensive care unit	Patients with subsyndromal delirium	impact of anti-psychotics in preventing delirium	The study is not significant, which proves that use of anti-psychotics does not prevent delirium.
4.	Caraceni A, Nanni O et al	Palliative care center	Advanced cancer patients with palliative care	Impact of delirium on survival of advanced cancer patients	Diagnosis of delirium significantly worsens the life expectancy.

5.	Van den Boogaard M, Schoonhoven L, et al	Intensive care unit	Critically ill patients	Impact of delirium on ICU patients	Delirium increases the hospital stay and it delays the prognosis
6.	G. Jiayang et al	Intensive care unit	Delirium sequential sedation patients.	Risk factor of delirium in ICU	Age, regular smoking, usage of high dose of sedatives like fentanyl.
7.	Bart Van Rompaey and Leo Bossaert et al	Intensive care unit	Critically ill patients	Risk factor of delirium in ICU	Chronic pathology, drug / alcohol abuse, use of psycho active medication are some factors causing delirium in ICUs.
8	NejlaTilouche, S. Souheil El Atrous et al	Intensive care unit	Critically ill patients	Assessment of delirium in ICUs who were admitted with “no delirium”	The mechanical ventilation, length of stay in ICU, catheters are all some risk factors to cause delirium in ICU.
9.	Ihsan Mattar	Intensive care unit	Mechanically ventilated patients	Multivariable analysis to assess delirium	Mechanically ventilated patients were at very high risk of delirium.

10.	Felipe Martinez	Cardiac ICU, MICU & SICU	Subsyndromal delirium patients.	Use of benzodiazipines shown to be the risk factor for delirium	Benzodiazepines were identified as the most significant pharmacological risk factor for delirium.
11.	Micheal.C.Reade& Simon Finfer	ICU (Burns / Trauma)	Critically ill patients	Use of dexmedetomidine as a sedative in preventing delirium	Dexmedetomidine was comparatively effective than benzodiazepine as a sedative in preventing delirium
12.	Catalina Tobar and Nathan Hill	All the wards	Elderly people	Multicomponent intervention in preventing delirium	Multicomponent intervention was effective in preventing delirium
13.	Tia R.M. Kostas	Complete Hospital systems	High risk patients	Multimodal non-pharmacological delirium prevention method	Multimodal non-pharmacological delirium prevention method was effective in improving the health of patients

14.	Hao Zhang	Post operative ICUs and Wards	Post operative adult patients	Multicomponent intervention preventing post operative delirium	Multicomponent intervention was effective in preventing the post operative delirium and shortens the length of hospital stay.
15.	Carlos Ignacio Beddings	Inpatient wards and ICUs	Intermediate or high risk patients of developing delirium.	Multicomponent intervention in delirium prevention	There is a benefits in non-pharmacological prevention of delirium when compared with standard management of delirium.
16.	Kathryn.T Von Rueden et al	Intensive care Unit	Critically ill patients	Delirium prevention protocol	If the delirium prevention protocols are used in ICUs and intermittent care unit the occurrence of delirium can be prevented.
17.	Felipe Martinez et al	Unidad decuidadosIntensivos General Hospital.	Critically ill patients	Components like early mobilization, physical therapy, re-orientation, cognitive stimulation, drug	When these strategy is applied to the samples the risk of delirium is reduced from 38% to 24%.

				review, environmental stimulation, avoidance of sensory deprivation, pain control, restrain use avoidance, family participation are used to prevent delirium	
18.	Dustin.M.Hipp E	Intensive Care Unit	Mechanical ventilated patients.	Comparision of pharmacological and non-pharmacological management of delirium.	The non pharmacological measures (Spontaneous Awakening Trail Spontaneous breath Trail and early physical mobility) is more effective in preventing delirium by reducing the hospital(ICU) stay.

19	Claudia Disabatino Smith and Petra Grami	St.Luke's Medical Centre, Texas	High risk patients those who are prone for delirium.	Delirium prevention bundle	After implementing the delirium prevention bundle the risk of delirium is reduced by 78%(P=0.001)
20.	Leona Bannol et al	Intensive Care Unit	Critically ill patients	The non pharmacological measures (Spontaneous Awakening Trail Spontaneous breath Trail and early physical mobility, Noise reduction and light reduction) is more effective in preventing delirium.	The pharmacological management have not been shown to be effective for delirium when compared with non-pharmacological management.

CHAPTER - III
RESEARCH METHODOLOGY

According to Polit and Beck, (2004), methodology of research refers to investigation of way of obtaining, organizing and analyzing data. Methodological studies address the development, validation and evaluation of research tool and methods.

This chapter deals with description of the different steps undertaken by the investigator in the study. It includes the research design, setting, variables, population, sample size, sample technique, sample criteria, description of the tool, content validity, pilot study, ethical consideration, data collection procedure and plan for data analysis.

Research Design

The research design used for this study was experimental pre testpost test control group design.

Experimental group: O_1 X O_2

Control group: O_1 O_2

O_1 Pretest assessment of delirium score, agitation score, pain score

X Implementation of Delirium prevention bundle

O_2 Posttest assessment of delirium score, agitation score, pain score

Research Variables:

Independent Variable - Delirium prevention bundle

Dependent Variable - Delirium score, agitation score, pain score

Setting of the Study:

The study was conducted at KMCH hospital Coimbatore. It is multispecialty tertiary hospital with all modern technology. MICU – I (had 14 beds) and SICU – I (had 14 beds) patients were taken for the study. Intensive care units have got latest gadgets and infrastructure that enables to provide high quality patient care. Equipments includes multi-parameter monitor, invasive and non invasive ventilators, intra aortic balloon pump (IABP), syringe pumps, sequential compression devices (SCD), patient warming system, fluid warmers and motorized cot, portable X ray, ultrasound and ECHO machines, cardiac output monitoring, ICP monitoring, continuous renal replacement therapy (CRRT) and extra corporeal membrane oxygenation (ECMO).It is 850 bedded NABH accredited hospital.

Population

All critically ill patients were admitted in MICU & SICU, KMCH, Coimbatore.

Sample

Critically ill patients who met inclusion criteria and admitted in SICU & MICU of KMCH, Coimbatore.

Sampling Technique

Samples were selected by non-random convenient sampling.

Sample Size

Totally 60 samples were recruited among 60 samples, 30 as experimental group and 30 samples as control group for the study.

Criteria for Sample Selection

Inclusion Criteria

- The patients who were critically ill.
- The patients who had no previous history of admission in ICU
- Patient who were in the age group of 30 - 65 years
- Patients admitted in ICU for more than 24 hours
- Patients on mechanical ventilator.
- Patients whose GCS score was 8 – 10T

Exclusion Criteria:

- Patients who were unconscious.
- Patients who had the history ofmental illness.
- Patients who had endocrine disorders like hypo and hyper pituitarism, hypo and hyper thyroidism, hypo and hyper parathyroidism, hypo and hyper adrenalism.
- Patients who had the history of substance abuse like alcohol, drugs, etc.,

Description of the Design

Manipulation :Delirium prevention bundle was the intervention. It includes five components namely

Sedation Awakening Trail (SAT),

Spontaneous Breath Trail(SBT),

Co-ordination of both SAT & SBT/Choice of Analgesia,

Non-Pharmacological management and environmental control,

Early bed mobilization.

Control group :

The equivalent control group assigned by random allocation received conventional treatment and care .

Randomization :

Permuted block randomization was adopted for allocation of participants to control or experimental protocol.

Description of the tool

The tool was developed after extensive review of literature, internet search and discussion with the experts. In order to prevent the delirium in intensive care unit, a structured questionnaire for socio demographic and clinical variables and Richmond Agitation- Sedation Scale (RASS, Critical Care Pain Observation Tool (CPOT), Intensive Care Delirium Screening Checklist (ICDSC)was used for the study.

Section A: Demographic Variables and Clinical Variable:

Demographic variables includes age, sex, marital status, educational status, occupation and monthly income, the clinical variables include length of ICU stay, duration of hospital stay, days of mechanical ventilation.

Section B: Richmond Agitation- Sedation Scale (RASS)

This scale was developed by Sessler CN, Gosnell M, et. al.,(2002), it consist of components like 0- alert and calm, +1 – restless, +2- agitated, +3- very agitated, +4-Combative, -1 drowsy, -2 light sedation, -3 moderate sedation, -4 deep sedation, -5 un-arousal.

Section C: Critical Care Pain Observation Tool (CPOT)

This scale was developed by Gelinas.C, Fillion et. Al, (2006), it consist of components like facial expression or body movement, muscle tension, ventilation compliance or vocalization, pain with movement. Each component has maximum score 2 & minimum score 0, and total score 8.

Section D: Intensive Care Delirium Screening Checklist (ICDSC)

This scale was developed by Bergeron et.al,(2001), it consist 8 components such that 1- altered level of consciousness ,2- inattention ,3-disorientation ,4-hallucination delusion or psychosis ,5-psychomotor agitation or retardation ,6-inappropriate speech or mood,7-sleep wake cycle disturbance ,8-symptom fluctuation and if the score is 0 it is normal, 1-3 sub syndromal delirium ,4- delirium

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Testing of the tool:

Reliability of the tool:

The reliability of the tool was tested using Crohnbach's Alpha method The internal consistency reliability coefficients were found to be high with crohnbach's alpha values for Richmond Agitation- Sedation Scale (RASS) r -0.87; Critical Care Pain Observation Tool (CPOT) r -0.85; Intensive Care Delirium Screening Checklist (ICDSC) r-0.82 respectively. Hence the tool was considered highly reliable for proceeding with the main study.

Pilot Study

Pilot study generally involves a small sample of subjects drawn from the same population as those from which the study sample were drawn. The pilot study

was conducted in the MICU-I and SICU-I at KMCH, Coimbatore. Prior to the pilot study, permission was received from the head of the department of Intensive care unit. The results evidenced that there was a significance in pre-test and post test level of delirium prevention among critically ill patients. The pilot study revealed that the study was practically feasible.

Data Collection Procedure

Prior to data collection necessary permission received from the Chairman, Principal, Head Of the Department (Intensive Care Unit) to conduct the study in MICU and SICU. The study was approved by the ethical committee of KMCH. The demographic and clinical characteristics of the patient were collected at the time of data collection. The data was collected using the above mentioned tool.

In the study process, total 60 samples were collected from MICU -I and SICU -I. The patients for the study were selected based on inclusion criteria each day 10 subjects were selected by means of cluster randomization. Afterwards they were assigned to two groups namely experimental and control groups. Pretest was conducted for both the groups, then the bundle was implemented for the experimental group. The samples were assessed by 4 trained people (3- nurses and a researcher) at morning and evening and inter-rated reliability was established. The experimental group received delirium prevention bundle for 4 consecutive days and after 4 consecutive days of intervention posttest was evaluated. Similarly, for the control group, the subjects were assessed for pre test and the bundle was not implemented and then post test was conducted in fourth day along with the experimental group. The bundle implementation was initiated during the morning rounds.

Data analysis

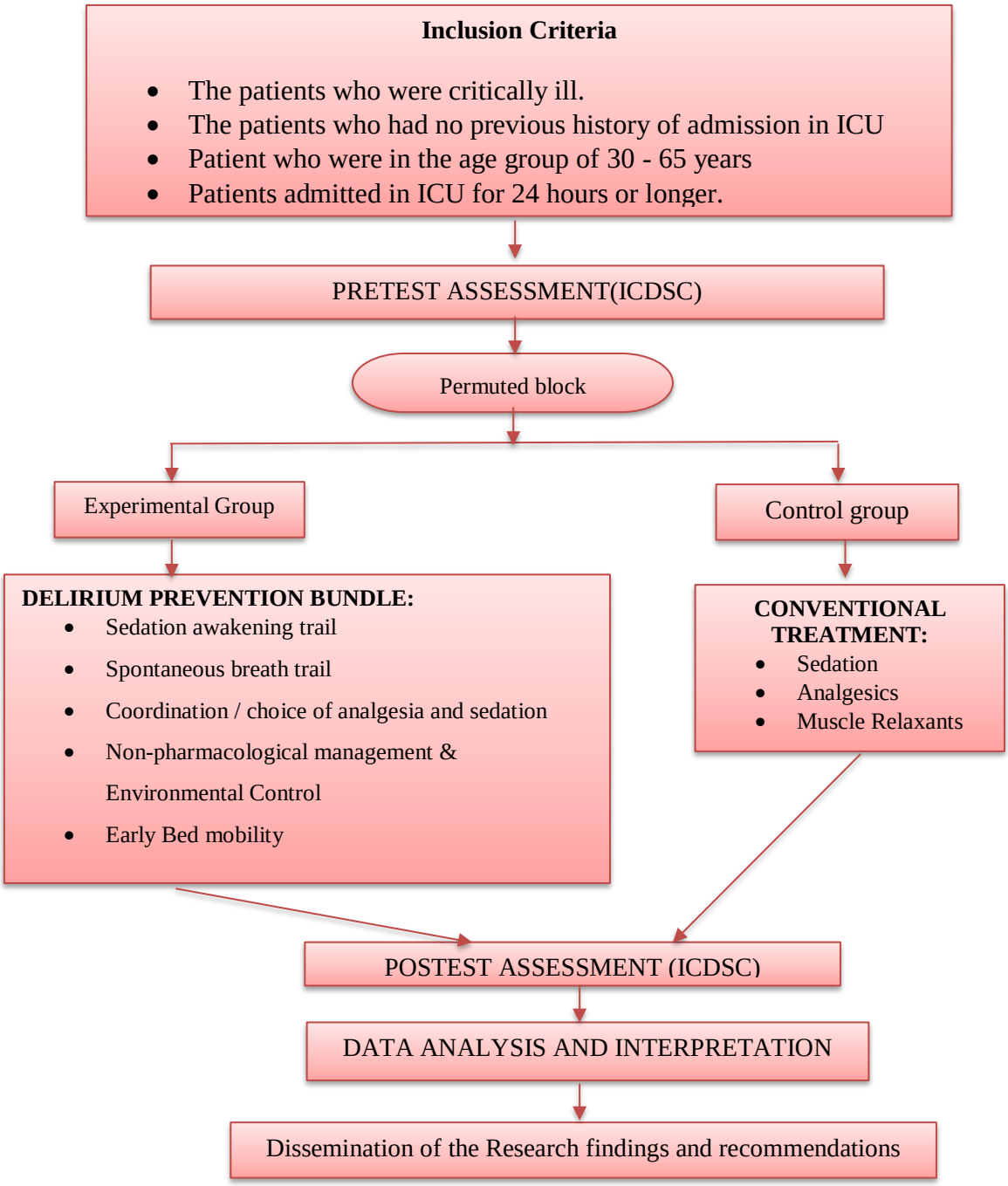
The data collected was analyzed by means of descriptive statistics, and inferential statistics.

Descriptive Statistics:

1. Analysis of the baseline data was done by using frequency and percentage.
2. Level of delirium among critically ill patients was analyzed by computing frequency, percentage, mean and standard deviation.

Inferential Statistics:

1. Within group comparison of pretest and posttest of ICDSC, RASS and CPOT scores of experimental and control group was done using paired 't' test.
2. The delirium score (ICDSC), RASS and CPOT score of experimental and control group was compared using independent 't' test.
3. Chi-square analysis was used to determine the association between the level delirium prevention and selected socio demographic variables among critically ill patients.



Schematic Representation of the study methodology

CHAPTER - IV
DATA ANALYSIS AND INTERPRETATION

This chapter presents the analysis and interpretation of the data collected to determine the impact of delirium prevention bundle among critically ill patients admitted in intensive care unit at KMCH, Coimbatore.

The analysis of data involves the translation of the information collected during the course of the research project into interpretable, convenient and descriptive terms and to draw inferences from them using statistical methods. The purpose of analysis is to summarize, compare and test the proposed relationships and infer findings. The collected data was tabulated and analyzed using descriptive and inferential statistical in order to meet the objectives of the study, and to test the hypotheses.

The data collected were interpreted under the following sections

Section – I

Distribution of demographic variables and clinical variables among critically ill patients admitted in intensive care unit.

Section - II

Description of assessment of delirium incidence among critically ill patients admitted in intensive care unit.

Section - III

Effectiveness of delirium prevention bundle in decreasing delirium incidence among critically ill patients admitted in intensive care unit.

Section- IV

Association between the posttest level of ICDSC score with their selected demographic variables and clinical variables.

SECTION - I

Distribution of demographic variables and clinical variables among critically ill patients admitted in intensive care unit.

Table – 1: Frequency and percentage distribution of demographic variable among critically ill patients admitted in intensive care unit.

Demographic variables		Group			
		Experiment (n=30)		Control (n=30)	
		n	%	n	%
Age	30 -45 years	5	16.67%	6	20.0%
	45 -55 years	18	60.00%	12	40.0%
	55 -65 years	7	23.33%	12	40.0%
Sex	Male	18	60.00%	15	50.0%
	Female	12	40.00%	15	50.0%
Education	Primary education	3	10.00%	7	23.3%
	High school	11	36.67%	12	40.0%
	Graduate	10	33.33%	7	23.4%
	No formal education	6	20.00%	4	13.3%
Marital Status	Single	0	0.00%	0	0.0%
	Married	30	100.00%	30	100.0%
	Separated	0	0.00%	0	0.0%
Occupation	Unemployed	11	36.67%	6	20.0%
	Self employed	14	46.67%	16	53.3%
	Professional	4	13.33%	7	23.3%
	Retired	1	3.33%	1	3.3%

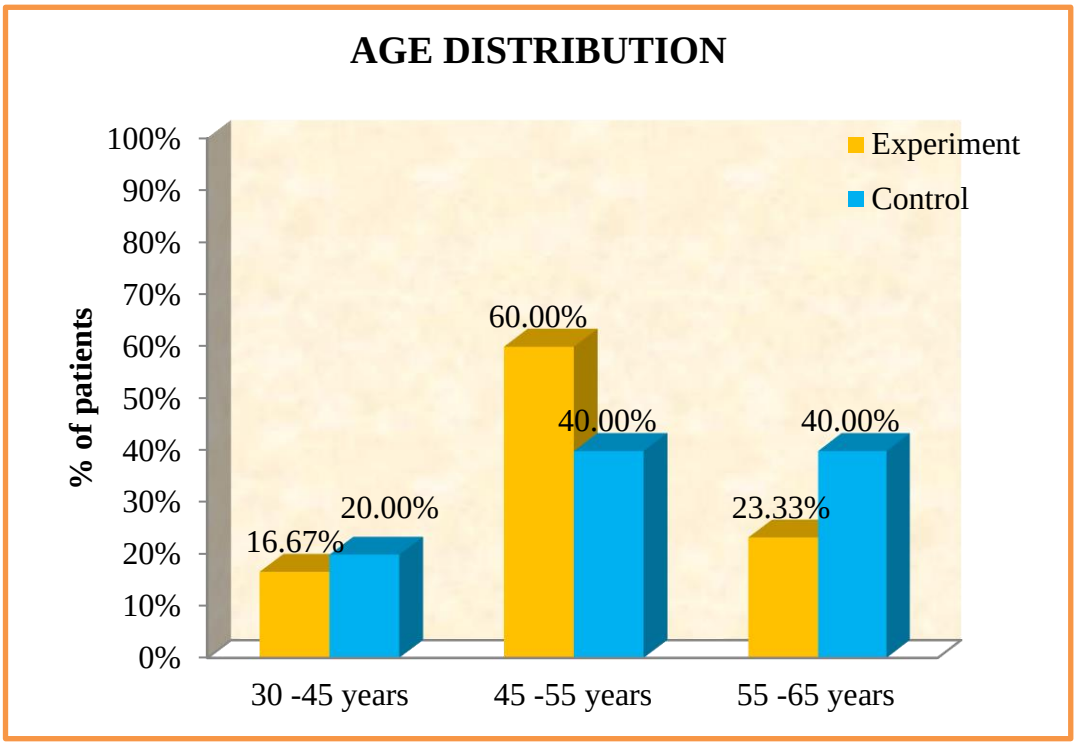
From table-1, it describes the distribution of demographic variable is clearly understood that with regard to the age in experimental group about 60%(18) of them falls between the age group of 45 –55 years and in control group, about 40%(12) of them falls between the age group of 45 –55 years, and about 40%(12) of them falls between the age group of 55-65 years.

Similarly, with regard to gender in experimental group about 60%(18) of them are male in control group about 50%(15) of them are male while 50%(15) of them are female.

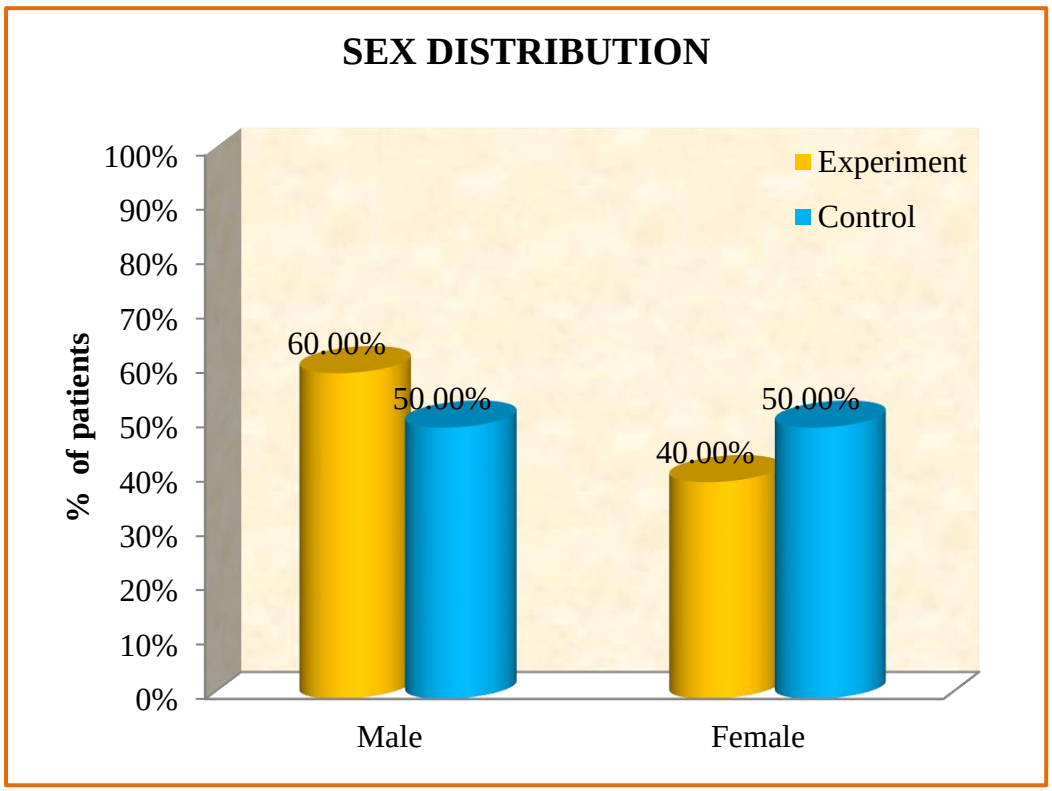
With regard to educational status 36.67%(11) of them are having high school education, 33.3%(10) of them are graduate, in experimental group. While in control group, 40%(12) of them are having high school education, 13.3%(4) of them are having no formal education

This distribution of marital status in experimental group consists of about 100%(30) are married, and there is no single or separated person. In control group about 100%(30) are married, and there is no single or separated person.

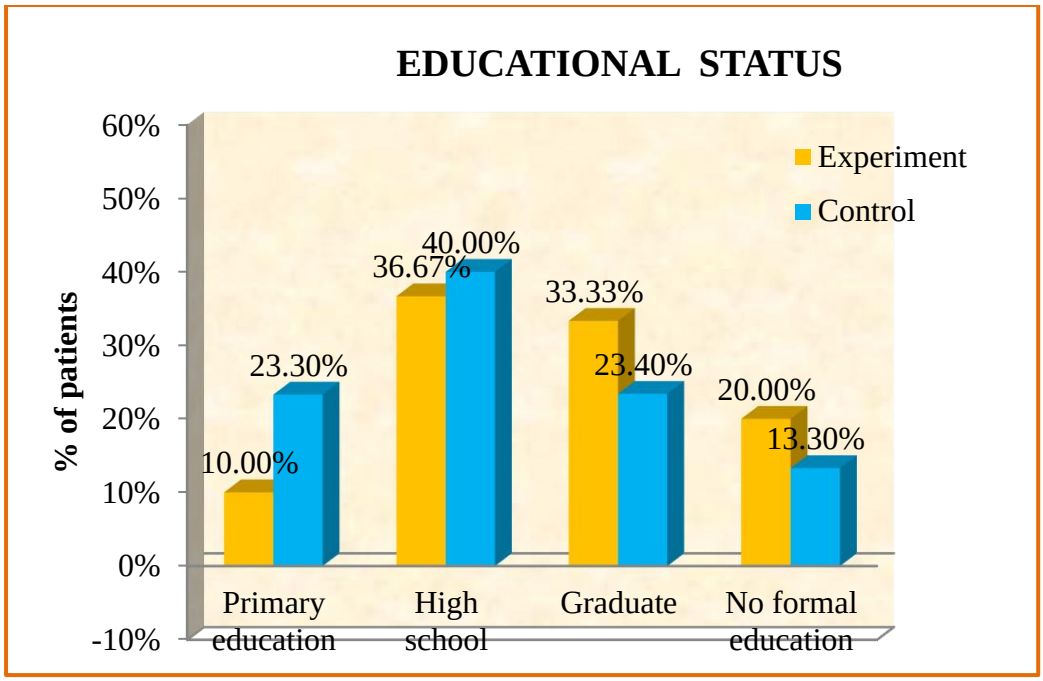
The table shows that the occupational status in experimental group about 46.67%(14), are self employed, 3.33%(1) are retired and in control group the occupational status about 53.3%(16), and 3.3%(1) of them are retired.



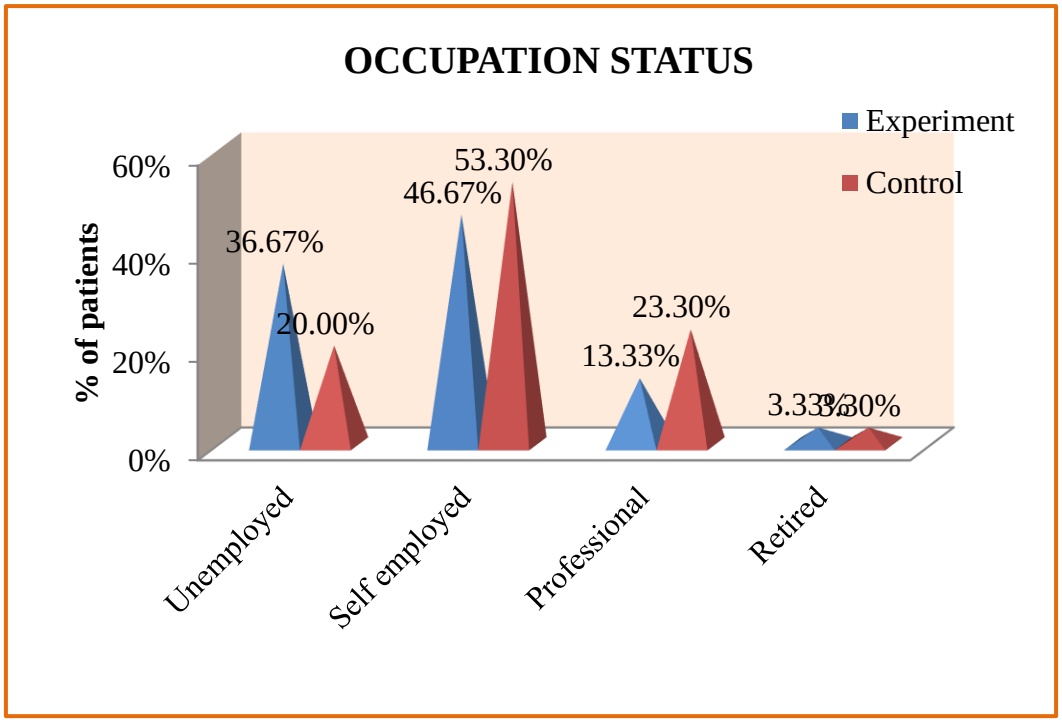
The figure-2 depicts the age wise distribution of participants



The Figure-3 depicts the sex wise distribution of participants



The figure- 4 shows the educational status wise distribution of participants



The figure-5 depicts the occupational status wise distribution of participants

Table-2: Frequency and percentage distribution of clinical variable among critically ill patients admitted in intensive care unit.

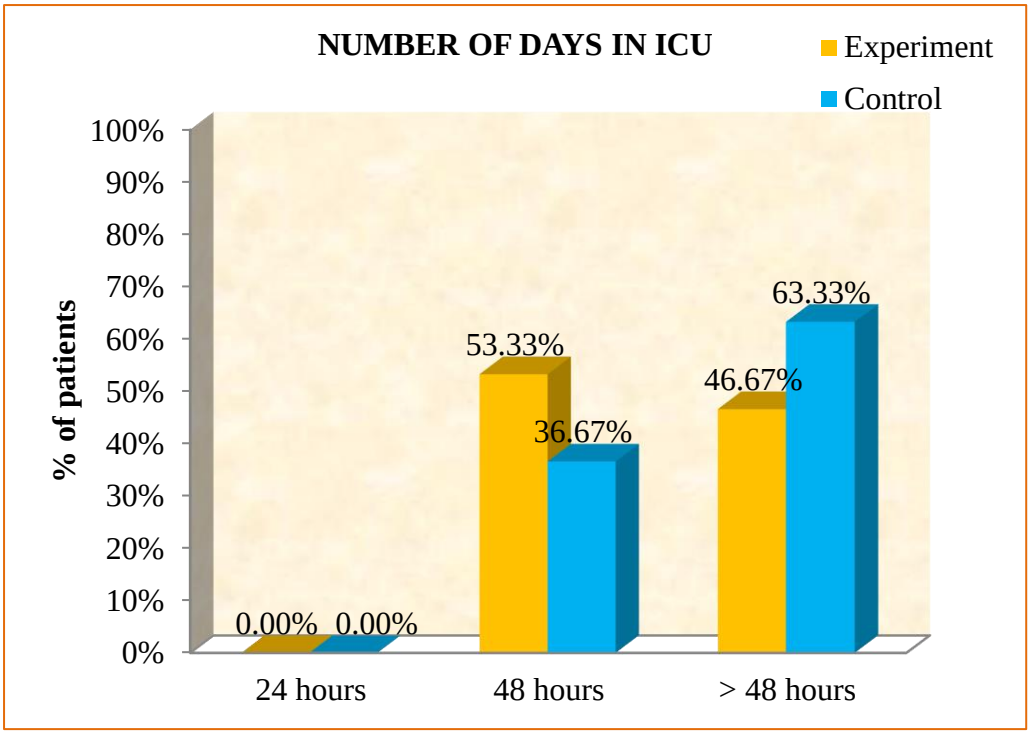
Clinical variables		Group			
		Experiment (n=30)		Control (n=30)	
		n	%	n	%
No. of days in ICU	24 hours	0	0.00%	0	0.0%
	48 hours	16	53.33%	11	36.67%
	> 48 hours	14	46.67%	19	63.33%
No. of days in Mechanical Ventilator	24 hours	0	0.00%	0	0.0%
	48 hours	16	53.33%	21	70.00%
	> 48 hours	14	46.67%	9	30.00%
GCS	Above 10t	0	0.00%	0	0.00%
	8-10t	30	100.00%	30	100.00%
	Below 8t	0	0.00%	0	0.00%
Choice of Analgesic	Midazolam	0	0.00%	21	70.00%
	Fentanyl	0	0.00%	9	30.00%
	Dexmeditomidine	30	100.00%	0	0.00%

This table describes that in experimental group number of days in ICU is about 53.33% (16) of them with 48 hours and in control group with regard to 63.33%(19) of them are more than 48 hours.

In experimental group with regard to number of days in Mechanical Ventilator was about 53.33%(16) of them with 48 hours and in control group was about 70%(21) of them with 48 hours.

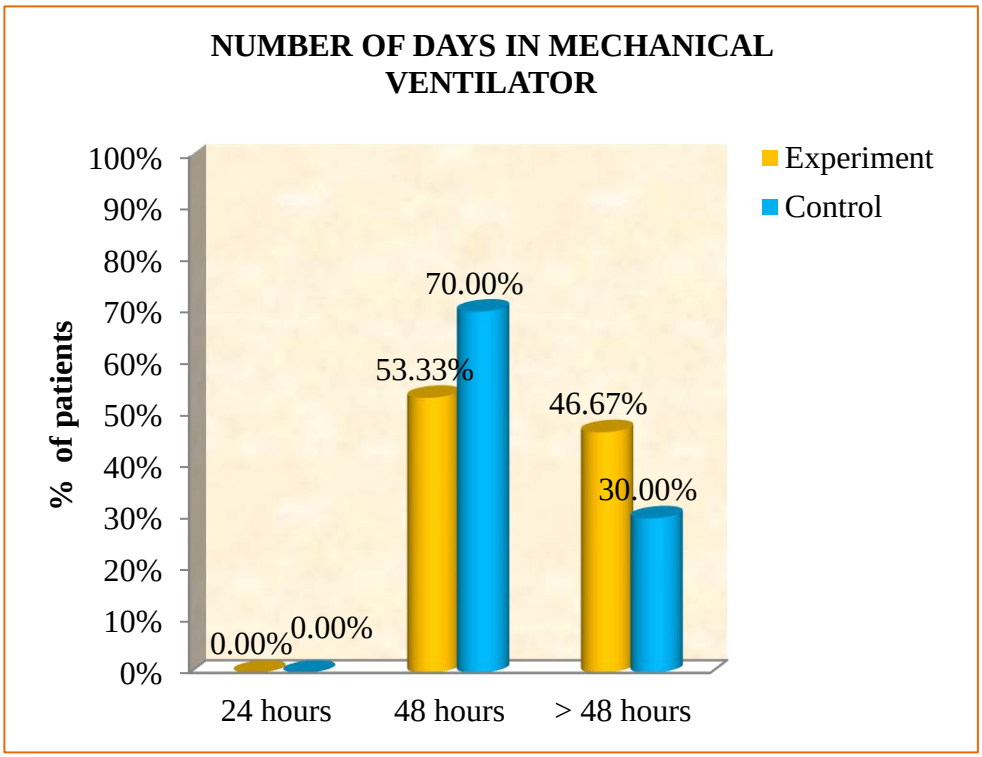
In experimental group with regard GCS about 100%(30) of the patients were between 8-10 no one comes under 8 and above 10. In control group with regard GCS about 100%(30) of the patients were between 8-10 no one comes under 8 and above 10 .

In experimental group choice of analgesia was about 100%(30) of the patients were given dexmeditomidine. In control group it was about 70%(21) of the patientswere given midazolam as analgesic and 30%(9) were given fentanyl as analgesics.

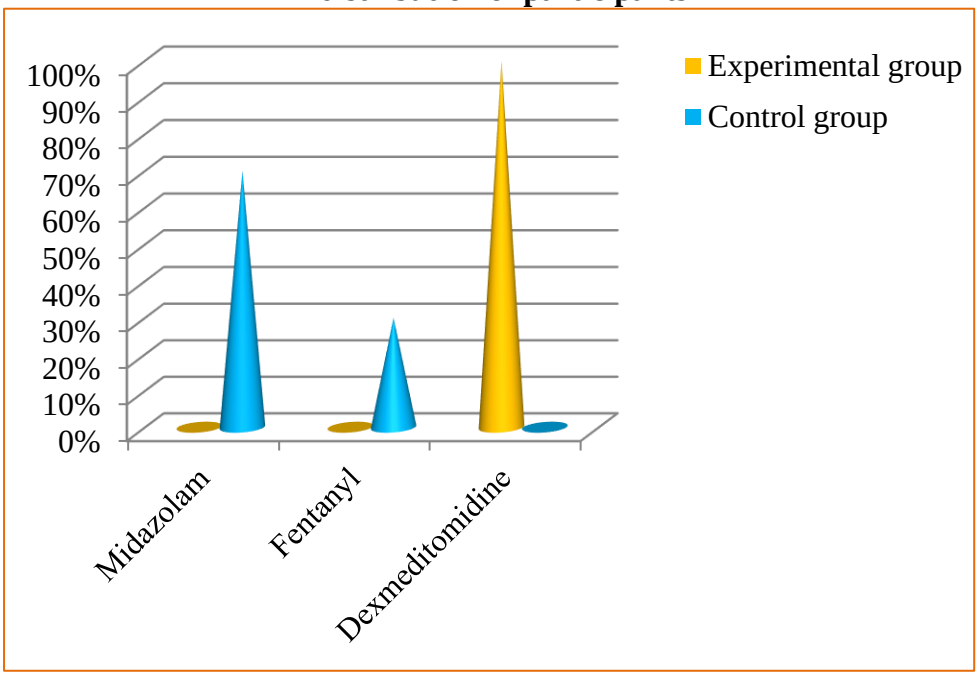


The figure-6 depicts the number of days in ICU

stay distribution of participants



The figure-7 shows the number of days in mechanical ventilator wise distribution of participants



The figure-8 shows the Choice of analgesic wise distribution of participants

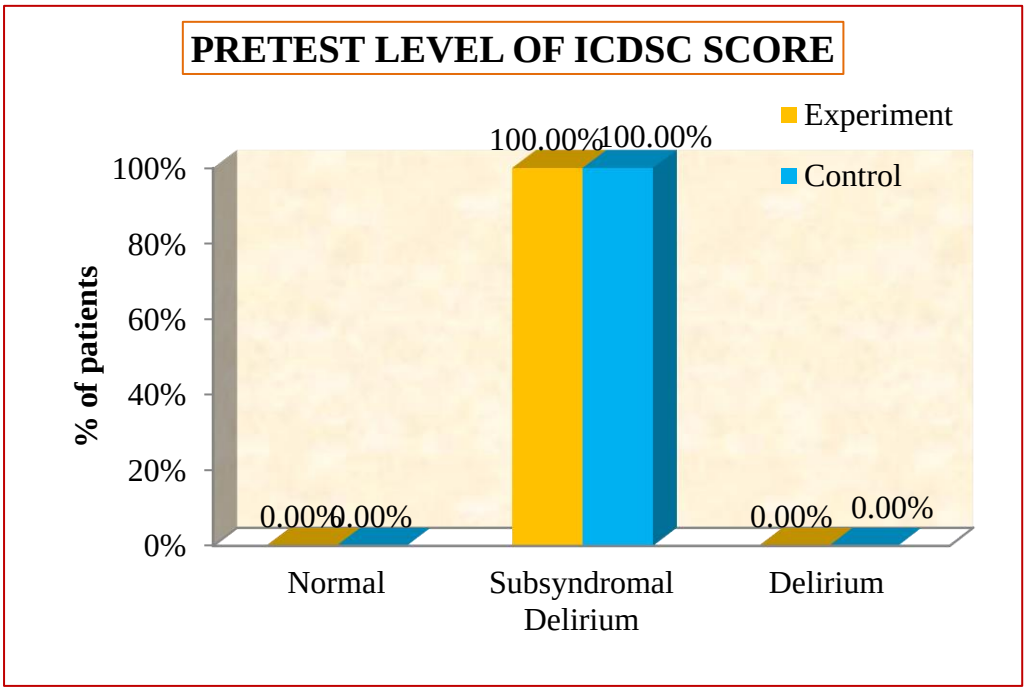
SECTION - II

Description of assessment of delirium incidence among critically ill patients admitted in intensive care unit.

Table-3: distribution of pretest level of ICDSC score in experimental and control group.

Category	ICDSC Scores	Group			
		Experiment		Control	
		N	%	n	%
Normal	0	0	0.0%	0	0.0%
Subsyndromal Delirium	1-3	30	100.0%	30	100.0%
Delirium	4-8	0	0.0%	0	0.0%
TOTAL	**8**	**30**	**100.0%**	**30**	**100.0%**

The above table shows that in experimental group and control group the patients are at subsyndromal delirium 100%(30).

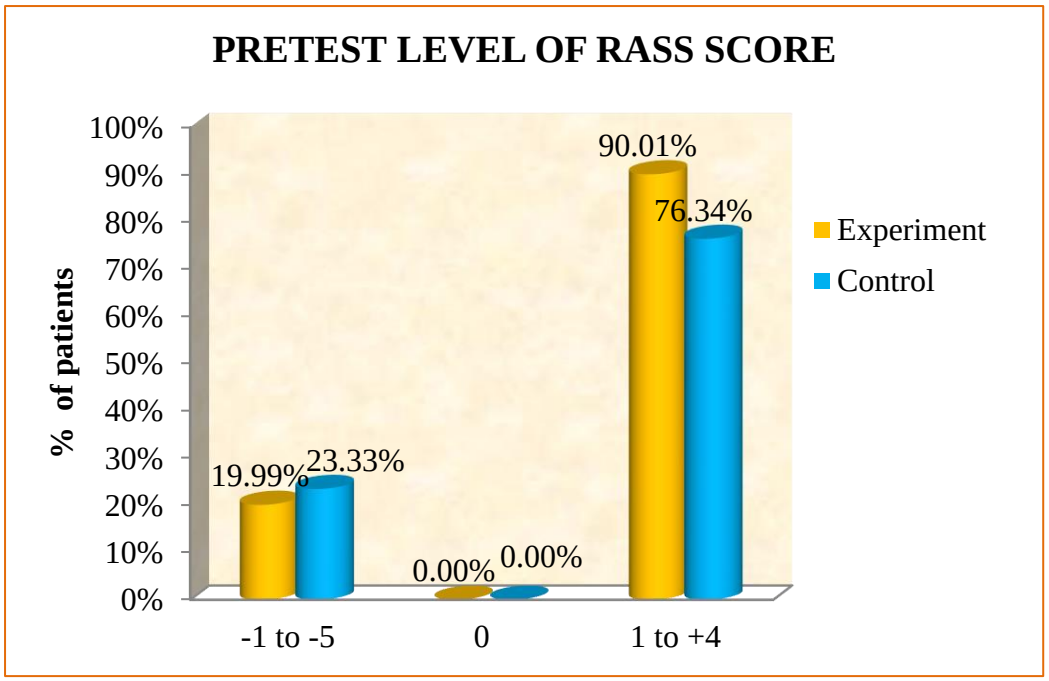


The figure-9 shows the pretest level of ICDSC score distribution of participants

Table-4: Frequency and percentage distribution of pretest level of RASS score in experimental and control group.

CATEGORY	RASS Score	Group			
		Experiment		Control	
		n	%	n	%
-1to -5	Drowsy to un-arousal	3	19.99%	7	23.33%
0	Alert	0	0.0%	0	0.0%
+1to +4	Agitated to Combative	27	90.01%	23	76.34%
TOTAL		**30**	**100.0%**	**30**	**100.0%**

In this above mention table in experimental group in pretest 19.99%(3) have the RASS score of -1to -5 and 90.01%(27) have the RASS score of +1 to +4. In control group in pretest 23.33%(7) have the RASS score of -1to -5 and 76.34%(23) have the RASS score of +1 to +4.

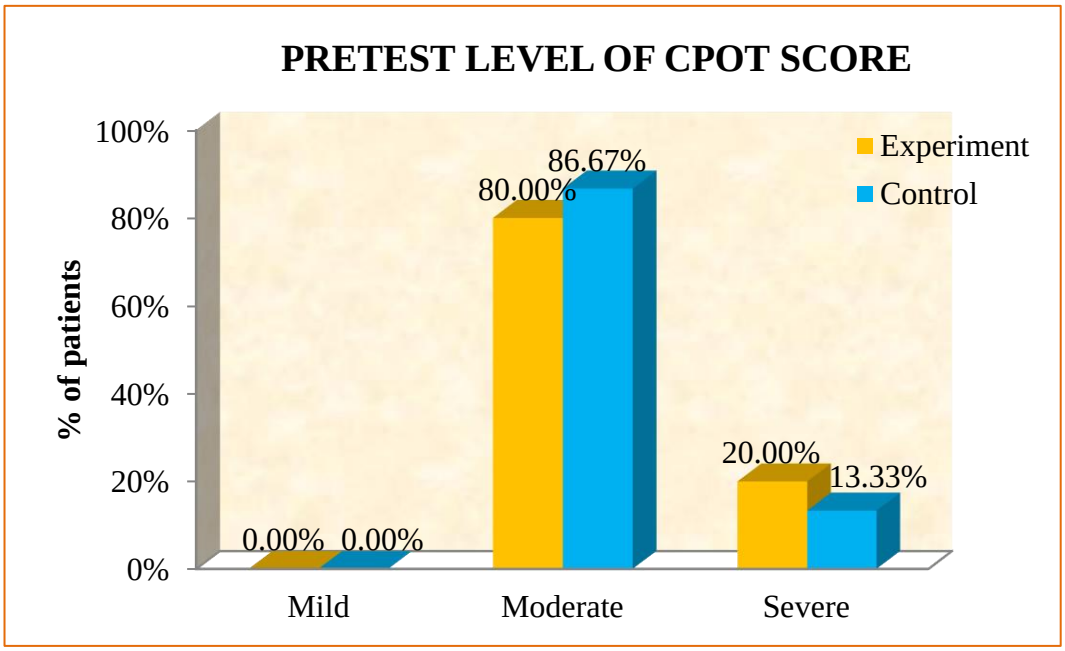


The figure-10 shows the pretest level of RASS score distribution of participants

Table-5: Distribution of pretest level of CPOT score in experimental and control group.

Category	CPOT score	Group			
		Experiment		Control	
		N	%	n	%
Mild	1-2	0	0.00%	0	0.00%
Moderate	3-4	24	80.00%	26	86.67%
Severe	>4	6	20.00%	4	13.33%
Total		**30**	**100.00%**	**30**	**100.00%**

In this above mention table the CPOT score in experimental group in pretest 80%(24) had moderate pain and 20%(6) had severe pain. In control group in pretest 86.67%(26) had moderate pain and 13.33%(4) had severe pain.



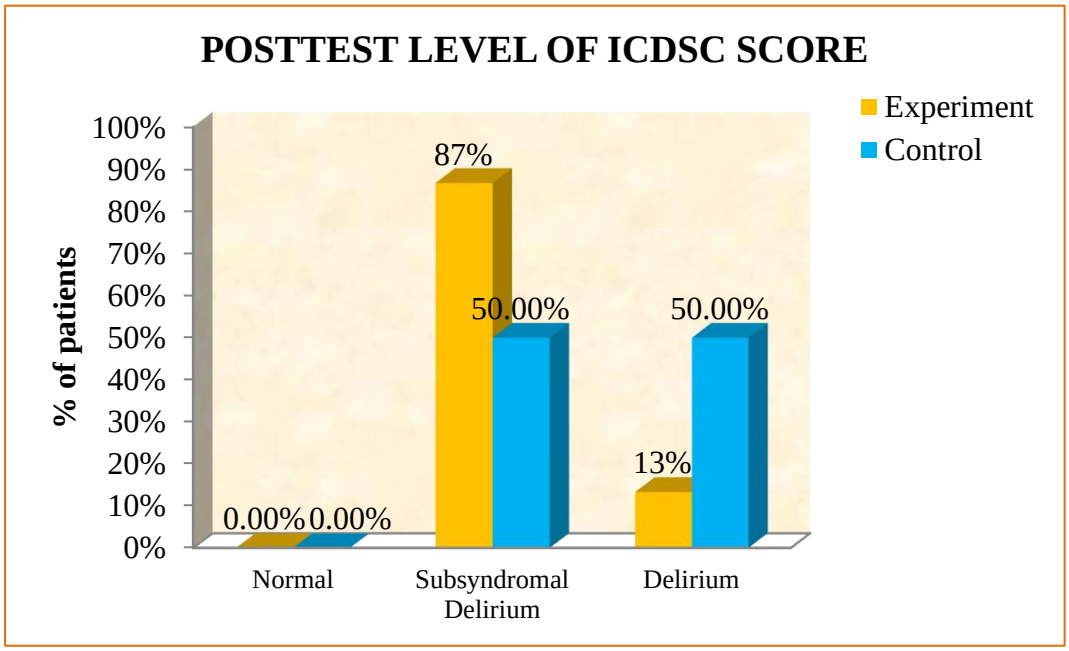
The figure-11 shows the pretest level of CPOT score distribution of participants

Table-6: Distribution of post test level of ICDSC score in experimental and control group.

Category	ICDSC Score	Group				Chi square test
		Experiment		Control		
		N	%	n	%	
Normal	0	0	0.00%	0	0.00%	$\chi 2=9.32 P=0.01^{**}(S)$
Subsyndromal Delirium	1-3	26	86.67%	15	50.00%	
Delirium	4-8	4	13.33%	15	50.00%	
TOTAL	**8**	**30**	**100.0%**	**30**	**100.0%**	

** P<0.01 highly significant S=significant

In posttest, 26(86.67%) of them have subsyndromal delirium in experimental group and in control group 15(50%) of them have subsyndromal delirum and delirium. **There is a significant difference between experiment and control group of ICDSC score** among critically ill patients admitted in intensive care unit. It was calculated using chi square test.



The figure-12 shows the posttest level of ICDSC score distribution of participants

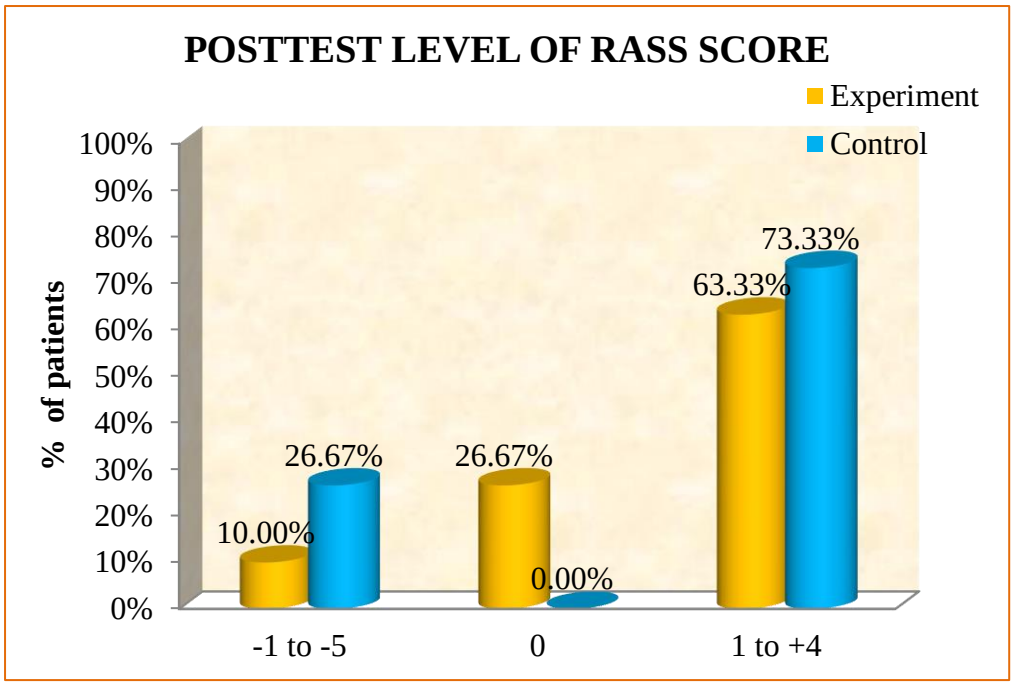
Table-7: Distribution of post test level of RASS score

in experimental and control group.

Category	RASS Score	Group				Chi square test
		Experiment		Control		
		n	%	n	%	
-1 to -5	Drowsy to deep sedation	3	10.00%	8	26.67%	$\chi 2=10.49$ P=0.01**(S)
0	Alert	8	26.67%	0	0.0%	
+1 to +4	Agitated to Combative	19	63.33%	22	73.33%	
TOTAL		**30**	**100.0%**	**30**	**100.0%**	

** P<0.01 highly significant S=significant

In posttest, 19(63.33%) of them have the RASS Score of 1to+4 in experimental group. In control group 22(73.33%) of them have the RASS Score of 1to+4 and **there is a significant difference between experiment and control group RASS score** among critically ill patients admitted in intensive care unit at KMCH, Coimbatore. It was calculated using chi square test.



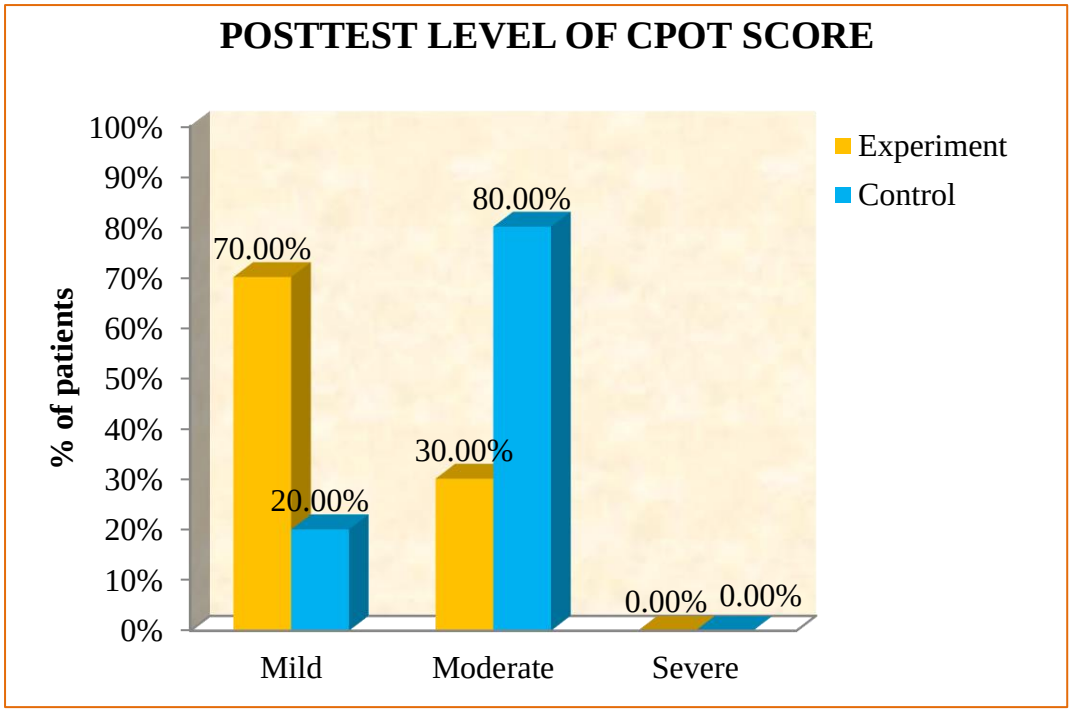
The figure-13 shows the posttest level of RASS score distribution of participants

Table-8: Distribution of post test level of CPOT score in experimental and control group.

Category	CPOT Score	Group				Chi square test
		Experiment		Control		
		N	%	n	%	
Mild	1-2	21	70.00%	6	20.00%	
Moderate	3-4	9	30.00%	24	80.00%	**χ^2=15.15 p=0.001***(S)**
Severe	>4	0	0.00%	0	0.00%	
Total		**30**	**100.00%**	**30**	**100.00%**	

*** P<0.01 very highly significant S=significant

In posttest, in experimental group 21(70%) have mild pain and in control group 24 (80%) of them have moderate level of pain. **There is a significant difference between experiment and control group CPOT score** among critically ill patients admitted in intensive care unit at KMCH, Coimbatore. It was calculated using chi square test.



The figure-14 shows the posttest level of CPOT score distribution of participants .

SECTION - III

Effectiveness of delirium prevention bundle in decreasing delirium incidence among critically ill patients admitted in intensive care unit.

Table-9: Comparison of pretest and post test delirium score, Agitation score and pain score of experimental group using paired t- test.

SCORES	Pretest		Posttest		Mean Difference	Paired t-test
	Mean	SD	Mean	SD		
ICDSC	4.77	.57	2.43	.50	2.34	t=23.37 P=0.001*** (S)
RASS	1.43	.82	.83	.59	0.60	t=5.13 P=0.001*** (S)
CPOT	5.63	.96	2.40	.50	3.23	t=17.59 P=0.001*** (S)

*** P<0.01 very highly significant S=significant

The above table signifies that in pretest the ICDSC mean (SD) is 4.77(.57), RASS mean (SD) is 1.43 (.82), CPOT mean (SD) is 5.63 (.96) and in posttest the ICDSC mean (SD) is 2.43(.50), RASS mean (SD) is .83 (.59), CPOT mean (SD) is 2.40 (.50). The mean difference and paired t-test value in experimental group is ICDSC mean difference 2.34 and paired t- test 23.37 (P=0.001), RASS mean difference 0.60 and paired t- test 5.13 (P=0.001), CPOT mean difference 3.23 and paired t- test 17.59 (P=0.001).

Table-10:Comparison of pretest and post test delirium score, Agitation score and pain score of control group using paired t- test.

SCORE	Pretest		Posttest		Mean Difference	Paired t-test
	Mean	SD	Mean	SD		
ICDSC	4.63	.49	3.50	.51	1.13	t=12.23 P=0.001***
RASS	1.23	1.72	1.10	1.34	0.13	t=0.20 P=0.81 (NS)
CPOT	5.37	.76	4.03	.49	1.34	t=10.26 P=0.001***

*** P<0.01 very highly significant NS= not significant

The above table signifies that in pretest the ICDSC mean (SD) is 4.63(.49), RASS mean (SD) is 1.23 (1.72), CPOT mean (SD) is 5.37 (.76) and in posttest the ICDSC mean (SD) is 3.50(.51), RASS mean (SD) is 1.10 (1.34), CPOT mean (SD) is 4.03 (.49). The mean difference and paired t-test value in experimental group is ICDSC mean difference 1.13 and paired t- test 12.23 (P=0.001), RASS mean difference 0.13 and paired t- test 0.20 (P=0.81), CPOT mean difference 1.34 and paired t- test 10.26 (P=0.001).

Table-11: Comparison of pretest delirium score, Agitation score and pain score of experimental and control group using t- test.

SCORES	Experiment		Control		Mean Difference	Independent t-test
	Mean	SD	Mean	SD		
ICDSC	4.77	.57	4.63	.49	0.14	t=0.97 P=0.33 (NS)
RASS	1.43	.82	1.23	1.72	0.20	t=0.56 P=0.57 (NS)
CPOT	5.63	.96	5.37	.76	0.27	t=1.18 P=0.24 (NS)

P>0.05 not significant NS= not significant

The above table signifies that in experimental group the ICDSC mean (SD) is 4.77(.57),RASS mean (SD) is 1.43 (.82), CPOT mean (SD) is 5.63 (.96) and in control group the ICDSC mean (SD) is 4.63(.49),RASS mean (SD) is 1.23 (1.72), CPOT mean (SD) is 5.37 (.76). the mean difference and unpaired t-test value in pretest level is ICDSC mean difference 0.14 and independent t- test 0.97 (P=0.33), RASS mean difference 0.20 and independent t- test 0.56 (P=0.57), CPOT mean difference 0.27 and independent t- test 1.18 (P=0.24).

Table-12:Comparison of post test delirium score, Agitation score and pain score of experimental and control group using t- test.

SCORES	Experiment		Control		Mean Difference	Independent t-test
	Mean	SD	Mean	SD		
ICDSC	2.43	.50	3.50	.51	1.07	t=8.16 P=0.001***
RASS	.83	.59	.67	1.18	0.16	t=2.05 P=0.04*
CPOT	2.40	.50	4.03	.49	1.63	t=12.80 P=0.001***

*** P<0.01 very highly significant.

The above table signifies that in experimental group the ICDSC mean (SD) is 2.43(.50), RASS mean (SD) is .83 (.59), CPOT mean (SD) is 2.40 (.50) and in control group the ICDSC mean (SD) is 3.50(.51),RASS mean (SD) is .67 (1.18), CPOT mean (SD) is 4.03 (.49). The mean difference and unpaired t-test value in posttest level is ICDSC mean difference1.07 and independent t- test 8.16 (P=0.001), RASS mean difference 0.16 and independent t- test 2.05 (P=0.04), CPOT mean difference 1.63 and independent t- test 12.80 (P=0.001).

SECTION – IV

Table-13: Association between posttest ICDSC score and demographic and clinical variables in experimental group.

Demographic variables		ICDSC						Chi square test
		Normal		Subsyndromal Delirium		Delirium		
		n	%	n	%	n	%	
Age	30 -45 years	4	80.0%	1	20.0%	0	0.0%	**$\chi 2$=8.24 p=0.01**(S)**
	45 -55 years	18	100.0%	0	0.0%	0	0.0%	
	55 -65 years	4	57.1%	3	42.9%	0	0.0%	
Sex	Male	18	100.0%	0	0.0%	0	0.0%	**$\chi 2$=9.32 p=0.01**(S)**
	Female	8	75.0%	4	25.0%	0	0.0%	
Education	Primary education	3	100.0%	0	0.0%	0	0.0%	$\chi 2$=1.01 p=0.78(NS)
	High school	10	90.9%	1	9.1%	0	0.0%	
	Graduate	8	80.0%	2	20.0%	0	0.0%	
	No formal education	5	83.3%	1	16.7%	0	0.0%	
Marital Status	Single	0	0.0%	0	0.0%	0	0.0%	$\chi 2$=0.00 p=1.00(NS)
	Married	26	86.7%	4	13.3%	0	0.0%	
	Separated	0	0.0%	0	0.0%	0	0.0%	
Occupation	Unemployed	7	100.0%	0	0.0%	0	0.0%	$\chi 2$=4.03 p=0.25(NS)
	Self employed	12	75.0%	4	25.0%	0	0.0%	
	Professional	6	100.0%	0	0.0%	0	0.0%	
	Retired	1	100.0%	0	0.0%	0	0.0%	

Demographic variables		ICDSC						Chi square test
		Normal		Subsyndromal Delirium		Delirium		
		n	%	n	%	n	%	
No.of days in ICU	24 hours	0	0.0%	0	0.0%	0	0.0%	$\chi 2=0.02$ p=0.88(NS)
	48 hours	14	87.5%	2	12.5%	0	0.0%	
	> 48 days	12	85.7%	2	14.3%	0	0.0%	
No.of days in Mechanical Ventilator	24 hours	0	0.0%	0	0.0%	0	0.0%	$\chi 2=0.02$ p=0.88(NS)
	48 hours	14	87.5%	2	12.5%	0	0.0%	
	> 48 days	12	85.7%	2	14.3%	0	0.0%	
GCS	Above 10T	0	0.0%	0	0.0%	0	0.0%	$\chi 2=0.00$ p=1.00(NS)
	8T-10T	26	86.7%	4	13.3%	0	0.0%	
	Below 8T	0	0.0%	0	0.0%	0	0.0%	
Choice of Analgesics	Midazolam	4	80.0%	1	20.0%	0	0.0%	**$\chi 2=8.24$ p=0.01** (S)**
	Fentanyl	4	57.1%	0	0.0%	0	0.0%	
	Dexmeditomidine	18	100%	3	42.9%	0	0.0%	

The above table shows the association between posttest ICDSC score and demographic variables among experiment group. Younger age patients and male patients are benefitted more than others and those who have given dexmeditomidine. It was confirmed using chi square test.

Table-14: Association between posttest ICDSC score and demographic and clinical variables in control group.

Demographic variables		ICDSC						Chi square test
		Normal		Subsyndromal Delirium		Delirium		
		N	%	n	%	n	%	
Age	30 -45 years	0	0.0%	5	83.3%	1	16.7%	$\chi 2=4.00$ p=0.13(NS)
	45 -55 years	0	0.0%	6	50.0%	6	50.0%	
	55 -65 years	0	0.0%	4	33.3%	8	66.7%	
Sex	Male	0	0.0%	9	60.0%	6	40.0%	$\chi 2=1.20$ p=0.27NS)
	Female	0	0.0%	6	40.0%	9	60.0%	
Education	Primary education	0	0.0%	4	57.1%	3	42.9%	$\chi 2=4.61$ p=0.20(NS)
	High school	0	0.0%	7	58.3%	5	41.7%	
	Graduate	0	0.0%	4	57.1%	3	42.9%	
	No formal education	0	0.0%	0	0.0%	4	100.0%	
Marital Status	Single	0	0.0%	0	0.0%	0	0.0%	$\chi 2=0.00$ p=1.00(NS)
	Married	0	0.0%	15	50.0%	15	50.0%	
	Separated	0	0.0%	0	0.0%	0	0.0%	
Occupation	Unemployed	0	0.0%	2	33.3%	4	66.7%	$\chi 2=3.20$ p=0.36(NS)
	Self employed	0	0.0%	7	43.8%	9	56.3%	
	Professional	0	0.0%	5	71.4%	2	28.6%	
	Retired	0	0.0%	1	100.0%	0	0.0%	
No.of days in ICU	24 hours	0	0.0%	0	0.0%	0	0.0%	$\chi 2=0.14$p=0.70(NS)

Demographic variables		ICDSC						Chi square test
		Normal		Subsyndromal Delirium		Delirium		
		N	%	n	%	n	%	
	48 hours	0	0.0%	5	45.5%	6	54.5%	
	> 48 days	0	0.0%	10	52.6%	9	47.4%	
No.of days in Mechanical Ventilator	24 hours	0	0.0%	0	0.0%	0	0.0%	$\chi 2=0.15$ p=0.69(NS)
	48 hours	0	0.0%	11	52.4%	10	47.6%	
	> 48 days	0	0.0%	4	44.4%	5	55.6%	
GCS	Above 10T	0	0.0%	0	0.0%	0	0.0%	$\chi 2=0.00$ p=1.00(NS)
	8T-10T	0	0.0%	15	50.0%	15	50.0%	
	Below 8T	0	0.0%	0	0.0%	0	0.0%	
Choice of Analgesics	Midazolam	0	0.0%	4	44.4%	5	55.6%	$\chi 2=0.15$ p=0.69(NS)
	Fentanyl	0	0.0%	11	52.4%	10	47.6%	
	Dexmeditomidine	0	0.0%	0	0.0%	0	0.0%	

The Table shows the association between posttest ICDSC score and demographic variables among control group. None of the variables are significant. It was confirmed using chi square test.

Table 15: Association between posttest RASS score and demographic and clinical variables in experimental group.

Demographic Variables		RASS						Chi square test
		-1 to -5		0		+1 to +4		
		n	%	n	%	n	%	
Age	30 -45 years	1	20.0%	4	80.0%	0	0.0%	**$\chi 2=12.03$ p=0.02*(S)**
	45 -55 years	2	11.1%	2	11.1%	14	77.8%	
	55 -65 years	0	0.0%	2	28.6%	5	71.4%	
Sex	Male	2	11.1%	3	16.7%	13	72.2%	$\chi 2=2.30$ p=0.32 (NS)
	Female	1	8.3%	5	41.7%	6	50.0%	
Education	Primary education	0	0.0%	1	33.3%	2	66.7%	$\chi 2=9.52$ p=0.14 (NS)
	High school	1	9.1%	3	27.3%	7	63.6%	
	Graduate	2	20.0%	0	0.0%	8	80.0%	
	No formal education	0	0.0%	4	66.7%	2	33.3%	
Marital Status	Single	0	0.0%	0	0.0%	0	0.0%	$\chi 2=0.00$ p=1.00 (NS)
	Married	3	10.0%	8	26.7%	19	63.3%	
	Separated	0	0.0%	0	0.0%	0	0.0%	
Occupation	Unemployed	1	14.3%	4	57.1%	2	28.6%	$\chi 2=10.92$ p=0.09 (NS)
	Self employed	0	0.0%	3	18.8%	13	81.3%	
	Professional	2	33.3%	1	16.7%	3	50.0%	
	Retired	0	0.0%	0	0.0%	1	100.0%	

Demographic Variables		RASS						Chi square test
		-1 to -5		0		+1 to +4		
		n	%	n	%	n	%	
No.of days in ICU	24 hours	0	0.0%	0	0.0%	0	0.0%	**$\chi 2$=9.55 p=0.01** (S)**
	48 hours	1	6.3%	8	50.0%	7	43.8%	
	> 48 hours	2	14.3%	0	0.0%	12	85.7%	
No.of days in Mechanical Ventilator	24 hours	0	0.0%	0	0.0%	0	0.0%	**$\chi 2$=9.55 p=0.01** (S)**
	48 hours	1	6.3%	8	50.0%	7	43.8%	
	> 48 hours	2	14.3%	0	0.0%	12	85.7%	
GCS	Above 10T	0	0.0%	0	0.0%	0	0.0%	$\chi 2$=0.00 p=1.00 (NS)
	8T-10T	3	10.0%	8	26.7%	19	63.3%	
	Below 8T	0	0.0%	0	0.0%	0	0.0%	
Choice of Analgesics	Midazolam	4	80.0%	1	20.0%	0	0.0%	**$\chi 2$=8.24 p=0.01** (S)**
	Fentanyl	4	57.1%	0	0.0%	0	0.0%	
	Dexmeditomidine	18	100%	3	42.9%	0	0.0%	

The above table shows the association between posttest RASS score and demographic variables among experiment group. Younger age patients,< 48 hours in ICU, < 48 hours in mechanical ventilator patients are benefitted more than others those who have given dexmeditomidine. It was confirmed using chi square test.

Table 16: Association between posttest RASS score and demographic and clinical variables in control group.

Demographic variables		RASS						Chi square test
		-1 to -5		0		+1 to +4		
		n	%	n	%	n	%	
Age	30 -45 years	2	33.3%	0	0.0%	4	66.7%	χ2=3.80 p=0.14(NS)
	45 -55 years	5	41.7%	0	0.0%	7	58.3%	
	55 -65 years	1	8.3%	0	0.0%	11	91.7%	
Sex	Male	2	13.3%	0	0.0%	13	86.7%	χ2=2.72 p=0.10NS)
	Female	6	40.0%	0	0.0%	9	60.0%	
Education	Primary education	1	14.3%	0	0.0%	6	85.7%	χ2=3.21 p=0.36(NS)
	High school	4	33.3%	0	0.0%	8	66.7%	
	Graduate	3	42.9%	0	0.0%	4	57.1%	
	No formal education	0	0.0%	0	0.0%	4	100%	
Marital Status	Single	0	0.0%	0	0.0%	0	0.0%	χ2=0.00 p=1.00(NS)
	Married	8	26.7%	0	0.0%	22	73.3%	
	Separated	0	0.0%	0	0.0%	0	0.0%	
Occupation	Unemployed	1	16.7%	0	0.0%	5	83.3%	χ2=0.85 p=0.84(NS)
	Self employed	5	31.3%	0	0.0%	11	68.8%	
	Professional	2	28.6%	0	0.0%	5	71.4%	
	Retired	0	0.0%	0	0.0%	1	100%	
No.of days in ICU	24 hours	0	0.0%	0	0.0%	0	0.0%	χ2=0.01p=0.95 (NS)
	48 hours	3	27.3%	0	0.0%	8	72.7%	
	> 48 days	5	26.3%	0	0.0%	14	73.7%	

No.of days in Mechanical Ventilator	24 hours	0	0.0%	0	0.0%	0	0.0%	$\chi 2=0.13$ p=0.71(NS)
	48 hours	6	28.6%	0	0.0%	15	71.4%	
	> 48 days	2	22.2%	0	0.0%	7	77.8%	
GCS	Above 10T	0	0.0%	0	0.0%	0	0.0%	$\chi 2=0.00$ p=1.00(NS)
	8T-10T	8	26.7%	0	0.0%	22	73.3%	
	Below 8T	0	0.0%	0	0.0%	0	0.0%	
Choice of Analgesics	Midazolam	0	0.0%	4	44.4 %	5	55.6%	$\chi 2=0.15$ p=0.69(NS)
	Fentanyl	0	0.0%	11	52.4 %	10	47.6%	
	Dexmeditomidine	0	0.0%	0	0.0%	0	0.0%	

The table shows the association between posttest RASS score and demographic variables among control group. None of the variables are significant. It was confirmed using chi square test.

Table 17: Association between posttest CPOT score and demographic and clinical variables in experimental group.

Demographic variables		CPOT						Chi square test
		Mild		Moderate		Severe		
		n	%	n	%	N	%	
Age	30 -45 years	4	19.0%	1	11.1%	0	0.0%	**$\chi 2=12.03$ p=0.02*(S)**
	45 -55 years	12	57.1%	6	66.7%	0	0.0%	
	55 -65 years	5	23.8%	2	22.2%	0	0.0%	
Sex	Male	16	88.9%	2	11.1%	0	0.0%	**$\chi 2=7.64$p=0 .05* (S)**
	Female	5	41.7%	7	58.3%	0	0.0%	
Education	Primary education	1	33.3%	2	66.7%	0	0.0%	$\chi 2=2.46$ p=0.48(NS)
	High school	8	72.7%	3	27.3%	0	0.0%	
	Graduate	8	80.0%	2	20.0%	0	0.0%	
	No formal education	4	66.7%	2	33.3%	0	0.0%	
Marital Status	Single	0	0.0%	0	0.0%	0	0.0%	$\chi 2=0.00$ p=1.00(NS)
	Married	21	70.0%	9	30.0%	0	0.0%	
	Separated	0	0.0%	0	0.0%	0	0.0%	
Occupation	Unemployed	7	100.0%	0	0.0%	0	0.0%	$\chi 2=4.90$p=0 .17 (NS)
	Self employed	9	56.3%	7	43.8%	0	0.0%	
	Professional	4	66.7%	2	33.3%	0	0.0%	
	Retired	1	100.0%	0	0.0%	0	0.0%	
No.of days in ICU	24 hours	0	0.0%	0	0.0%	0	0.0%	$\chi 2=0.40$ p=0.52(NS)
	48 hours	12	75.0%	4	25.0%	0	0.0%	
	> 48 hours	9	64.3%	5	35.7%	0	0.0%	

Demographic variables		CPOT						Chi square test
		Mild		Moderate		Severe		
		n	%	n	%	N	%	
No.of days in Mechanical Ventilator	24 hours	0	0.0%	0	0.0%	0	0.0%	$\chi 2=0.40$ p=0.52(NS)
	48 hours	12	75.0%	4	25.0%	0	0.0%	
	> 48 hours	9	64.3%	5	35.7%	0	0.0%	
GCS	Above 10T	0	0.0%	0	0.0%	0	0.0%	$\chi 2=0.00$ p=1.00(NS)
	8T-10T	21	70.0%	9	30.0%	0	0.0%	
	Below 8T	0	0.0%	0	0.0%	0	0.0%	
Choice of Analgesics	Midazolam	5	23.8%	2	22.2%	0	0.0%	**$\chi 2=12.03$ p=0.02*(S)**
	Fentanyl	4	19.0%	1	11.1%	0	0.0%	
	Dexmeditomidine	12	57.1%	6	66.7%	0	0.0%	

The above table shows the association between posttest CPOT score and demographic variables among experiment group. Younger age patients and male patients are benefitted more than others those who have given dexmeditomidine. It was confirmed using chi square test.

Table 18: Association between posttest CPOT score and demographic and clinical variables in control group.

Demographic variables		CPOT						Chi square test
		Mild		Moderate		Severe		
		n	%	n	%	n	%	
Age	30 -45 years	0	0.0%	6	100.0%	0	0.0%	$\chi 2=1.89$ p=0.39(NS)
	45 -55 years	3	25.0%	9	75.0%	0	0.0%	
	55 -65 years	3	25.0%	9	75.0%	0	0.0%	
Sex	Male	1	6.7%	14	93.3%	0	0.0%	$\chi 2=3.33$
	Female	5	33.3%	10	66.7%	0	0.0%	p=0.07NS)
Education	Primary education	2	28.6%	5	71.4%	0	0.0%	$\chi 2=1.65$ p=0.64(NS)
	High school	3	25.0%	9	75.0%	0	0.0%	
	Graduate	1	14.3%	6	85.7%	0	0.0%	
	No formal education	0	0.0%	4	100.0%	0	0.0%	
Marital Status	Single	0	0.0%	0	0.0%	0	0.0%	$\chi 2=0.00$ p=1.00(NS)
	Married	6	20.0%	24	80.0%	0	0.0%	
	Separated	0	0.0%	0	0.0%	0	0.0%	
Occupation	Unemployed	3	50.0%	3	50.0%	0	0.0%	$\chi 2=5.39$ p=0.14(NS)
	Self employed	3	18.8%	13	81.3%	0	0.0%	
	Professional	0	0.0%	7	100.0%	0	0.0%	
	Retired	0	0.0%	1	100.0%	0	0.0%	

Demographic variables		CPOT						Chi square test
		Mild		Moderate		Severe		
		n	%	n	%	n	%	
No.of days in ICU	24 hours	0	0.0%	0	0.0%	0	0.0%	$\chi 2=1.29 p=0.25$(NS)
	48 hours	1	9.1%	10	90.9%	0	0.0%	
	> 48 days	5	26.3%	14	73.7%	0	0.0%	
No.of days in Mechanical Ventilator	24 hours	0	0.0%	0	0.0%	0	0.0%	$\chi 2=3.21 p=0.07$(NS)
	48 hours	6	28.6%	15	71.4%	0	0.0%	
	> 48 days	0	0.0%	9	100.0%	0	0.0%	
GCS	Above 10T	0	0.0%	0	0.0%	0	0.0%	$\chi 2=0.00$ p=1.00(NS)
	8T-10T	6	20.0%	24	80.0%	0	0.0%	
	Below 8T	0	0.0%	0	0.0%	0	0.0%	
Choice of Analgesics	Midazolam	0	0.0%	0	0.0%	0	0.0%	$\chi 2=0.00$ p=1.00(NS)
	Fentanyl	6	20.0%	24	80.0%	0	0.0%	
	Dexmeditomidine	0	0.0%	0	0.0%	0	0.0%	

The above table shows the association between posttest CPOT score and demographic variables among control group. None of the variables are significant. It was confirmed using chi square test.

CHAPTER - V
DISCUSSION, SUMMARY, CONCLUSION, IMPLICATIONS AND RECOMMENDATIONS

This chapter deals with the discussion, summary and conclusion it also clarifies the implication and recommendation of the study given for the different areas of nursing practice, nursing education and nursing research.

The aim of the study to was to evaluate the effectiveness of delirium prevention bundle among critically ill patients. Randomized pretest post-test control group design was used to assess the effectiveness of delirium prevention bundle. Total 60 critically ill patients were selected from the MICU & SICU. The samples were selected using cluster randomization.

Discussion of socio demographic variables:

The distribution of demographic variable is clearly understood that with regard to the age in experimental group about 60%(18) of them belongs to the age group of 45 –55 years and in control group, about 40%(12) of them belongs to the age group of 45 –55 years.

Similarly, with regard to gender in experimental group about 60%(18) of them are male in control group about 50%(15) of them are male while 50%(15) of them are female.

With regard to educational status 36.67%(11) of them are having high school education, in experimental group. While in control group, 40%(12) of them are having high school education.

This distribution of marital status in experimental group and control group all the participants 100%(30) are married.

This distribution shows that the occupational status in experimental group about 46.67%(14), are self employed and in control group the occupational status about 53.3%(16).

Description of Characteristics of participants:

In experimental group about 53.33%(16) of them were with more than 48 hours of ICU care and in control group with regard to 63.33%(19) of them were with more than 48 hours of ICU care.

In experimental group with regard to number of days in Mechanical Ventilator with regard to 53.33%(16) of them with 48 hours and in control group with regard to 70%(21) of them with 48 hours.

In both experimental and control group with regard GCS about 100%(30) of the patients were between 8-10.

In experimental group only dexmeditomidine is used as a choice of analgesic 100%(30) and in control group about 70%(21) of them were given midazolam and 30%(9) were given fentanyl.

Findings based on objectives:

- **The first objective is to assess delirium incidence among critically ill patients admitted in intensive care unit at KMCH, Coimbatore.**

In experimental group and control group the patients in pretest are at subsyndromal delirium 100%(30) as per ICDSC score. In experimental group in pretest about 90.01%(27) have the RASS score of +1 to +4(restless to combative). In control group about 76.34%(23) have the RASS score of +1 to +4(restless to combative).The CPOT score in experimental group in pretest 80%(24) had moderate pain and in control group, pretest 86.67%(26) had moderate pain.

The present study finding is consisted with the study of **Van den Boogaard M, Schoonhoven L, et. al (2015)** conducted a study which states that delirium is a serious and frequent psycho-organic disorder in critically ill patients. Reported incidence rates vary to a large extent and there is a paucity of data concerning delirium incidence rates for the different subgroups of intensive care unit (ICU) patients and their short-term health consequences. The objective was to determine the overall incidence and duration of delirium, per delirium subtype and per ICU admission diagnosis. Furthermore, the researcher determined the short-term consequences of delirium.1613 patients were included of which 411 (26%) developed delirium. The incidence rate in the neurosurgical (10%) and cardiac surgery group (12%) was the lowest, incidence was intermediate in medical patients (40%), while patients with a neurological diagnosis had the highest incidence (64%). The mixed subtype occurred the most (53%), while the hyperactive subtype the least (10%). The median delirium duration was two days [IQR 1-7], but

significantly longer (P<0.0001) for the mixed subtype. More delirious patients were mechanically ventilated and for a longer period of time, were more likely to remove their tube and catheters, stayed in the ICU and hospital for a longer time, and had a six times higher chance of dying compared to non-delirium ICU patients, even after adjusting for their severity of illness score. Delirium was associated with an extended duration of mechanical ventilation, length of stay in the ICU and in-hospital, as well as with in-hospital mortality. The delirium incidence in a mixed ICU population is high and differs importantly between ICU admission diagnoses and the subtypes of delirium. Patients with delirium had a significantly higher incidence of short-term health problems, independent from their severity of illness and this was most pronounced in the mixed subtype of delirium.

- **The second objective to evaluate the effectiveness of delirium prevention bundle in decreasing delirium incidence among critically ill patients admitted in intensive care unit at KMCH, Coimbatore.**

In **pretest** the experimental group and control group the patients had **subsyndromal delirium 100%(30)as per ICDSC score**. In experimental group about **90.01%(27) had the RASS score of +1 to +4(restless to combative)**. In control group about 76.34%(23) had the RASS score of +1 to +4(**restless to combative**).The**CPOT score** in experimental group was **80%(24) had moderate pain** and in control group, pretest 86.67%(26) had moderate pain. In **posttest** the experimental group had at **subsyndromal delirium87%(26) as per ICDSC score.** In experimental group about **63.33%(19)** had **the RASS score of +1 to +4**(restless to combative). In control group about 73.33%(22) have the RASS score of +1 to +4(restless to combative). The **CPOT score** in experimental group **70%(21) had**

mild pain and in control group, pretest 80%(24) had moderate pain. The mean difference and paired t-test value in experimental group is ICDSC mean difference 2.34 and paired t- test 23.37 (P=0.001), RASS mean difference 0.60 and paired t-test 5.13 (P=0.001), CPOT mean difference 3.23 and paired t- test 17.59 (P=0.001). Which clearly states that **there is significant difference between the pretest and posttest level of prevention among experimental and control group.**

This study is consistent with the **Catalina Tobarand Nathan Hill, (2015),**conducted a study to assess the efficacy of multicomponent interventions in preventing incident delirium in the elderly. A systematic review of randomised trials was undertaken. Two independent reviewers performed iterative literature searches in seven databases without language restrictions. Grey literature repositories were considered as well. The quality of included trials was assessed by using the criteria established by the Cochrane Collaboration. When possible, data were synthesised into a meta-analysis. Heterogeneity was assessed using the χ^2 and I^2 tests. The findings were total of 21,788 citations were screened, and seven studies of diverse quality were included in the review, comprising 1,691 participants. Multicomponent interventions significantly reduced incident delirium (relative risk [RR] 0.73, 95% confidence interval [CI] 0.63–0.85, $P< 0.001$) and accidental falls during the hospitalisation (RR 0.39, 95% CI 0.21, 0.72, $P = 0.003$), without evidence of differential effectiveness according to ward type or dementia rates. Non-significant reductions in delirium duration, hospital stay and mortality were found as well and the interpretation was multicomponent interventions are effective in preventing incident delirium among elderly inpatients. Effects seemed to be stable among different settings. Due to the limited amount of data, potential benefits

in survival need to be confirmed in further studies. Future research should be aimed at contrasting different multicomponent programmes to select the most useful interventions. Hence the says that delirium is preventable.

One more study is consistent with the present study is **Felipe Martinez et al., (2014),** conducted a retrospective study among 227 critically ill patients, Unidad decuidados Intensivos General Hospital, Chile. CAM method was used to assess delirium and they are assessed twice daily. The components included in this study are early mobilisation, physical therapy, re-orientation, cognitive stimulation, drug review, environmental stimulation, avoidance of sensory deprivation, pain control, restrain use avoidance and family participation. Among 227 samples 54.7% were male, mean (SD) age, 63.3 (18.3) years, P=0.02. when these strategy is applied to the samples the risk of delirium is reduced from 38% to 24%. Hence this study states that the delirium is prevented using the Bundle.

- **The third objective is to associate the incidence of delirium among critically ill patients with their selected socio demographic and clinical variables admitted in intensive care unit at KMCH, Coimbatore.**

The association between posttest ICDSC score and demographic variables among experiment group. Younger age patients and male patients are benefitted more than others and those who have given dexmeditomidine, the association between posttest RASS score and demographic variables among experiment group. Younger age patients, < 48 hours in ICU, < 48 hours in mechanical ventilator patients are benefitted more than others and those who have given dexmeditomidine and the association between posttest CPOT score and demographic variables among

experiment group. Younger age patients and male patients are benefitted more than others and those who have given dexmeditomidine. It was confirmed using chi square test.

The present study is consistent with the study of **Ihsan Mattar. (2015),** conducted a multicenter prospective study among mechanically ventilated patients in Uganda. Eligible patients were screened daily for delirium using the confusional assessment method (CAM-ICU). Comparisons were made using -test, chi-squares, and Fisher's exact test. Predictors were assessed using logistic regression. The level of statistical significance was set and the results were of 160 patients, 81 (51%) had delirium. Median time to onset of delirium was 3.7 days. At bivariate analysis, history of mental illness, sedation, multiorgan dysfunction, neurosurgery, tachypnea, low mean arterial pressure, oliguria, fevers, metabolic acidosis, respiratory acidosis, anaemia, physical restraints, marital status, and endotracheal tube use were significant predictors. At multivariable analysis, having a history of mental illness, sedation, respiratory acidosis, higher PEEP, endotracheal tubes, and anaemia predicted delirium. Conclusion. The prevalence of delirium in a young African population is lower than expected considering the high mortality. A history of mental illness, anaemia, sedation, endotracheal tube use, and respiratory acidosis were factors associated with delirium. Hence the delirium is preventable as the age decreases and the length of ICU stay.

Summary

The study was conducted in KMCH Hospital, Coimbatore. The populations of the study were selected from MICU & SICU. Cluster randomization technique was used to select the patient. There were 60 patients selected for the study with the predetermined criteria for inclusion. The present study was aimed at evaluating the effectiveness of delirium prevention bundle among critically ill patients.

Objectives of the study were to

- describe delirium incidence among critically ill patients admitted in intensive care unit at KMCH, Coimbatore.
- evaluate the effectiveness of delirium prevention bundle in decreasing delirium incidence among critically ill patients admitted in intensive care unit at KMCH, Coimbatore.
- associate the incidence of delirium among critically ill patients with their selected socio demographic and clinical variables admitted in intensive care unit at KMCH, Coimbatore.

The following hypotheses were tested at 0.001 level

H_1: There is a significant difference between the mean pre-test and post test level of delirium prevention in experimental group among critically ill patients admitted in intensive care unit at KMCH, Coimbatore.

H_2: There is a significant difference between post test level of delirium prevention in experimental and control group among critically ill patients admitted in intensive care unit at KMCH, Coimbatore.

H_3: There is a significant association between level of delirium prevention among critically ill patients with their selected socio-demographic and clinicalvariables admitted in intensive care unit at KMCH, Coimbatore.

The assumption of the study were

- The patients those who are admitted in intensive care unit may have the risk of developing delirium.
- Pain and analgesic may have lot of influence on delirium.

The conceptual framework for this study was based on Betty neuman's System model. The focus of the theory is prevention of the disease by means of primary, secondary and tertiary prevention. A true experimental study was used in the study. The Attribute variable was Delirium prevention bundle.

The study subjects were selected using the cluster randomization and were assigned to experiment group and control group (30 in each group). The data collection tools used were

1. Socio demographic variable,
2. Clinical Variable
3. ICDSC Scale
4. RASS Scale
5. CPOT Scale

Pilot study was conducted to find out the feasibility of the study and it did not show any major flaw in the design of the study. After pilot study, reliability of the tool is assessed using crohnbach's alpha values for Richmond Agitation-Sedation Scale (RASS) r -0.87; Critical Care Pain Observation Tool (CPOT)

r -0.85; Intensive Care Delirium Screening Checklist (ICDSC) r-0.82 respectively. Hence the tool was considered highly reliable for proceeding with the main study. The main study was conducted and the data obtained were analyzed using both descriptive and inferential statistics.

The findings of the study showed that there was a very high significant difference between the post test score of delirium prevention bundle implemented group and non implemented group. The significant difference of delirium prevention bundle between the experimental and control group. ICDSC (t = 8.16, P =0.001 which is very high), RASS(t = 2.05, P =0.04 which is high), CPOT(t = 12.80, P =0.001 which is very high)

Major findings of the study

This study attempted to find out the impact of delirium prevention bundle among critically ill patients.

In experimental group and control group the patients in pretest are at subsyndromal delirium 100%(30) as per ICDSC score. In experimental group in pretest 19.99%(3) have the RASS score of -1to -5 and 90.01%(27) have the RASS score of +1 to +4. In control group it is 23.33%(7) and have the RASS score of -1to -5 and 76.34%(23) have the RASS score of +1 to +4.The CPOT score in experimental group in pretest 80%(24) had moderate pain and 20%(6) had severe pain. In control group in pretest 86.67%(26) had moderate pain and 13.33%(4) had severe pain.

Among experimental group in pretest the ICDSC mean (SD) is 4.77(.57), RASS mean (SD) is 1.43 (.82), CPOT mean (SD) is 5.63 (.96) and in posttest the ICDSC mean (SD) is 2.43(.50), RASS mean (SD) is .83 (.59), CPOT mean (SD) is 2.40 (.50). The mean difference and paired t-test value in experimental group is ICDSC mean difference 2.34 and paired t- test 23.37 (P=0.001), RASS mean difference 0.60 and paired t- test 5.13 (P=0.001), CPOT mean difference 3.23 and paired t- test 17.59 (P=0.001).

Among control group in pretest the ICDSC mean (SD) is 4.63(.49), RASS mean (SD) is 1.23 (1.72), CPOT mean (SD) is 5.37 (.76) and in posttest the ICDSC mean (SD) is 3.50(.51), RASS mean (SD) is 1.10 (1.34), CPOT mean (SD) is 4.03 (.49). The mean difference and paired t-test value in experimental group is ICDSC mean difference 1.13 and paired t- test 12.23 (P=0.001), RASS mean difference 0.13 and paired t- test 0.20 (P=0.81), CPOT mean difference 1.34 and paired t- test 10.26 (P=0.001).

The association between posttest ICDSC score and demographic variables among experiment group. Younger age patients and male patients are benefitted more than others and those who have given dexmeditomidine, the association between posttest RASS score and demographic variables among experiment group. Younger age patients, < 48 hours in ICU, < 48 hours in mechanical ventilator patients are benefitted more than others and those who have given dexmeditomidine and the association between posttest CPOT score and demographic variables among experiment group. Younger age patients and male patients are benefitted more than others and those who have given dexmeditomidine. It was confirmed using chi square test.

Conclusion

The statistical evidence proved that the delirium prevention bundle had reduced the occurrence of delirium among critically ill patients who were admitted in KMCH, Coimbatore when compared with the control group. Hence the researcher concluded that the bundle is effective in preventing delirium among critically ill patients.

Nursing Implication

The Study findings shows the value of nurse's role in decreasing incidence of delirium among critically ill patients using a cost effective, harmless, non-invasive, Bundle in preventing delirium. It also signifies the significance of formulation of strategy and implementation of this bundle particularly at intensive care units. This study has brought out certain implications in the area of nursing practice, nursing education, nursing administration and in research also.

Implications in Nursing Practice

The above study has following implications on nursing practice

- The findings of the study help to eliminate the unwanted use of medication to treat delirium.
- It encourages the nursing personal to practice the delirium prevention in other clinical settings.
- Moreover, it is in expertise and cost effective intervention.

Implications in Nursing Education:

The above study has following implications on nursing education

- The nursing students must be taught about the prevention of delirium in ICU as we know prevention is better than cure.

Implications in Nursing Research

The above study has following implications on nursing research

- This study provides scope for future research and utilization of findings.
- Further studies can be encouraged to assess the level of prevention among critically ill patients.

Recommendations

The investigator recommends the following studies to strengthen the nursing care

- The study can be replicated on larger sample.
- This study can be conducted on other areas like medical wards.
- This study can be conducted by using different research design like qualitative study (prospective design).
- A comparative study can be conducted with different group of population and other methods in preventing delirium.
- Similar study can be conducted with increasing the duration of intervention.

ABSTRACT

Study entitled "A study to assess the effectiveness of delirium prevention bundle among critically ill patients admitted in intensive care unit at KMCH, Coimbatore." **Objective**: The main aim of the study was to evaluate the effectiveness of delirium prevention bundle in decre**a**sing delirium incidence among critically ill patients .**Design:** Experimental pre testpost test control group design**. Setting**: MICU 1 & SICU 1of Kovai Medical Center Hospital ,Coimbatore .**Sample Size** :60 samples were recruited among them 30 as experimental group and 30 as control group .Conceptual Frame work : Modified Bettyneuman's System Model. **Data collection procedure:** After obtaining ethical clearance from concerned authorities, demographic variable, clinical variable were assessed by observation method. Delirium is assessed using ICDSC Scale, Agitation is assessed using RASS method, Pain assessed using CPOT Scale. **Results:** In this study the Delirium prevention bundle used in the aspect of Sedation Awakening Trail, Spontaneous Breath Trail, Coordination of both/Choice of Analgesic, Early bed mobility, etc., were provided for the patient as intervention. Which has shown the significant difference in preventing the delirium, with the $p<0.001$. **Conclusion:** The study results proves that the delirium prevention bundle is effective in preventing delirium among critically ill patients.

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DEMOGRAPHIC VARIABLE

1.Age

a) 30-45 years

b) 45-55 years

c) 55-65 years

2. Sex

a) Male

b) Female

3. Education

a) Primary education

b) High school

c) Graduated

d) No formal education

4. Marital Status

a) Single

b) Married

c) Separated

5. Occupation

a) Unemployed

b) Self employed

c) Professional

d) Retired

CLINICAL VARIABLES

1.Number of days in ICU

a) 24 hours

b) 48 hours

c) More than 48 days

2.Number of days on mechanical ventilation

a) 24 hours

b) 48 hours

c) More than 48 days

3. GCS

a) Above 10t

b) 8-10t

c) Below 8t

4. Choice of Analgesic

a) Midazolam

b) Fentanyl

c) Dexmeditomidine

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